Gas Journal

VOL. 293. 110th YEAR. LONDON, JANUARY 8, 1958 No. 4930 PRICE 1/6

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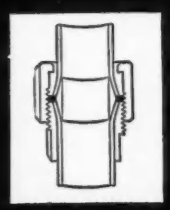

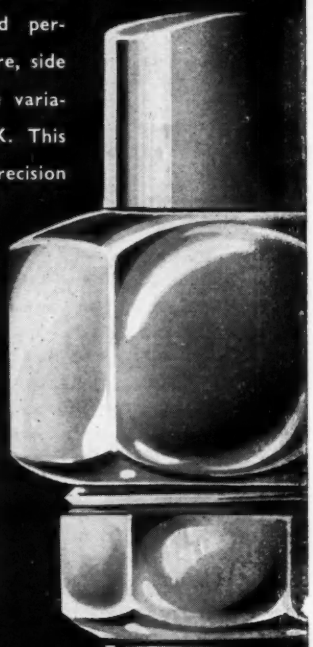

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Gas Journal

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110TH YEAR

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Gas Journal

VOLUME 293. No. 4930. JANUARY 8, 1958. 110th YEAR

How Useful is the Women's Gas Federation?

OF how much use is the Women's Gas Federation? We have just put this question to a number of friends in the industry from whom we have received a variety of replies. A district manager said, 'Virtually none'; a sales and service manager said, 'Quite a bit'; another said, 'Not enough to justify the trouble and expense'; an engineer said, 'We find our branch very useful'; another said, 'I know nothing about them'; a manufacturer said, 'We have to keep in with them whether it is worth it or not.' Which only goes to show that there is no unanimity of thought on the matter and that an assessment of the true worth of the W.G.F. is overdue. It is clear that whereas one section of the gas industry regards the Federation as a collection of middle-aged, semi-professional bun fight devotees who use gas as a slender excuse for indulging in an orgy of tea-drinking and gossip, another section sees it as a valuable barometer of public opinion and a (virtually) unpaid goodwill sales force. Which interpretation is correct? In our view, both of them. The value of the W.G.F. depends entirely on the use made of it by the various gas boards. Whereas one board may regard it as a harmless social circus which can be largely left to its own devices, another will utilise it as a vital point of contact with the consumer. There is, of course, a third type of board which has nothing to do with it at all!

The gas industry's domestic load is contracting. Unless something is done about it—and we are quite sure that it *can* be done—that contraction will continue. In other words we are in no position to dismiss a possible sales aid. Equally, of course, we cannot subsidise and pander to a non-productive social appendage, but things would have to be very bad indeed for the ending of this long-established body to be seriously contemplated. The approach which the industry should make to the question must surely be along these lines: Here is the Women's Gas Federation—how can we extract the maximum benefit from it?

The first thing to be borne in mind is the undoubted power and influence of the women's organisations. It is the easiest thing in the world to poke fun at them but to do so is as unwise as it is unfair. These bodies do a great deal of good and exert a powerful influence; characteristically that influence, although widely felt, is so subtle that its source is not always recognised by mere men, who sometimes labour under the misapprehension that they themselves are responsible for what is taking place! Moreover, the various guilds, institutes and associations are linked to each other by membership of such umbrella organisations as the National Council of Women and the Women's Group on Public Welfare. Thus ripples of opinion can travel a long way.

Members of the Women's Gas Federation are of course users of gas but since they number little more than 16,000 it cannot be argued that their importance as consumers is very great. What is important, however, is that they have a sufficiently high regard for gas to wish to spread its gospel abroad and widen public appreciation of its advantages. In this sense the Federation is a body of saleswomen, able to express their message in the most effective way of all—over a cup of tea in a neighbour's house, over the fence, through their unsuspecting husbands. That potential sales force is there, fully organised, but it will not sell anything unless it is helped and encouraged.

The first requirement then is for the gas boards to make sure that the members of their branches are fully conversant with what the industry has to offer in the way of appliances and service. That requires talks by sales officers, demonstrations, visits to showrooms, assistance from manufacturers and, of course, plenty of literature. There sometimes seems to be a curious reticence on the part of gas boards to 'talk gas' to the W.G.F., a feeling that it would not do for a commercial element to creep into their activities. Nothing could be more foolish. The Federation's prime interest is home making—which inevitably embraces the use of gas—and in addition, by virtue of its very name, the Federation has a pronounced bias towards this fuel. Therefore tell them the full gas story—they'll love it!

Another important point is to ensure that the chair-

men (who are usually ladies possessing considerable local influence) and committee members of branches are encouraged to attend certain gas board functions, to take an interest in the activities of gas consultative councils, and be present at the launching of new appliances. This will give them a sense of 'belonging' and will certainly enable them to publicise gas more accurately and enthusiastically.

By such means gas boards can help to make the best use of what should be a major asset to the industry, and at the same time enable the Federation to function more satisfactorily from the point of view of its members. But there are certain aspects of W.G.F.'s own affairs which might well be improved. For example, there should be a very determined effort to enlist members from among young housewives. It is sobering to reflect upon the proportion of gas users who are getting on in years; a great deal of our efforts should be concentrated on those who will be using gas in 20 or 30 years time. Again, cannot something be done to enliven those annual conferences which all too often bring forth speeches of unparalleled dullness from some of the leaders of our industry?

How can the W.G.F. help the gas industry? We suggest that the following are among the most important ways: By serving as a sounding board for opinions on all matters concerned with gas appliances and gas board service; by functioning as a form of field test for certain new equipment; by enabling the advantages of gas and the gas industry's viewpoint (including the Annual Reports) to be made known through the multitude of social and business contacts enjoyed by members; and by acting as a substantial and respected body of opinion able to approach the Government and local authorities in a manner denied the Gas Council and the area gas boards. Assistance of this kind—which, it must be agreed, could be invaluable—can only be rendered if the Federation is properly helped by the industry. There is more to operating a branch than allocating so many hours of a home service adviser's time to secretarial duties and arranging for an occasional prestige appearance by the board chairman or one of his officers. It should be the subject of careful study and management. Only if this care is given will the Women's Gas Federation make its proper contribution to the community and to the prosperity of the industry.

Disappointment in Coal

HOPES raised by the National Coal Board's results for the first half of the year were dashed by the news that a loss of £8,147,000 had been incurred during the third quarter. This was the worst result for any period since the second quarter of 1955, and its announcement coincided with the news that the Miners' Union will present a new wage claim in the next few weeks. The main reasons for the big deficit are disappointing production—a product of annual holidays, the epidemic of Asian flue which started in September, and increased absenteeism—and stock accumulation, particularly of small coals. There are at present some 9 mill. tons of these piling up, and the N.C.B. is paying rent on many of the stocking sites.

We have a vivid recollection of the benefits which were supposed to result from the heavy expenditure on power loading. Now, despite the fact that coal prices were increased by an average of 6s. 6d. a ton in July, there seems to be some doubt about the Board's ability to achieve the expected modest overall surplus in 1957.

Extra-sensory Perception

MAKING fun of people's names is not a particularly refined form of humour, but the item entitled 'Sniffle Group' which appears in the current issue of the *Radio Times* reveals such a string of coincidences that its writer must surely be forgiven. This short note, in 'Round and About,' explains how the 'Younger Generation' team on Network Three turned up with a surprising story the other day, when they were discussing the programme—at 6.15 p.m. today—on 'The standard nose.' This has nothing to do with size or shape, but purely sensitivity. Because the gas industry is bound by Act of Parliament to issue gas with a readily recognisable smell, there has therefore arisen the need to find someone with absolutely the right sense of smell to determine the standard amount of 'aroma,' to be put into normal domestic gas. 'Such a man,' states the article, 'has been found by the Gas Council Laboratories, Fulham—and he is, oddly enough, a Mr. Deadman. But the oddness about this whole business isn't confined to his name alone. For we discover that the Chairman of the British Medical Association Committee, concerned with the problem of old people with a diminished sense of smell, is a Dr. Leak, while chemical manufacturers connected with the search for a suitable 'smell' are Messrs. Whiffen, and one of the doctors concerned with research in this field is a Dr. Kataria.'

In the circumstances it is perhaps just as well that the programme planners did not come into contact with any of the gas board medical officers—like the North Eastern Board's Dr. Fear, for example!

Horror Comics and Cooking

THOSE who lack confidence in the future of this country should have a look at the Schoolboys' Own Exhibition—it will confirm their worst fears. Here is the nightmare world of Giles in terrifying reality. The growing incidence of guerilla bands of small boys, swirling clouds of litter, and grim pairs of police constables lead one inexorably towards the Horticultural Halls. Within all is diabolical clamour in which the lusty voice of British youth is aided and abetted by a remorseless P.A. system. When we visited the exhibition we fought our way desperately past the oddly assorted dangers of a 'living caveman' and things apparently destined for outer space, to find, like some wholesome haven in a world bent on destruction, a stand where boys—looking curiously angelic in chefs' hats—were *cooking*!

It says much for the perception of the North Thames, South Eastern and Eastern Boards that they should have foreseen the willingness of lads to forsake the bloodthirsty lure of other exhibits and cook under the direction of famous chefs. The really first-class stand was attracting tremendous interest and had already been the subject of channel 9 and B.B.C. programmes. There were other things to see and do on the stand—like responding to the invitation to wash one's hands. Perhaps that was a joke?

Personal

Members of the gas industry to receive awards in the New Year Honours list include LORD GEDDES, Part-time Member, Scottish Gas Board, who receives the C.B.E.; MR. STANLEY GWYNNE DEAVIN, Secretary, North Western Gas Board, the O.B.E.; while MR. WILLIAM THOMAS HIRD, Distribution Engineer and Planning Officer (Distribution), Wales Gas Board, and MR. ARTHUR GEORGE PALMER, Engineer, North Thames Gas Board, receive the M.B.E. The B.E.M. is awarded to MR. SAMUEL CALVERT, governor maintenance foreman, Leeds District, North Eastern Gas Board (Leeds); MR. GEORGE HUGGINS, assistant superintendent, Glasgow District gas-fitting and maintenance section, Scottish Gas Board; MR. PERCY PARKER, blacksmith, Worksop undertaking, East Midlands Gas Board; MR. ERNEST JAMES ROBSON, exhauster house attendant, Hendon works, Sunderland, Northern Board; MR. FRANK PERCIVAL SPENCER, apprentice-gasfitter training instructor, Leicester undertaking, East Midlands Gas Board; MR. WILLIAM NORMAN THOMAS, Engineer and Manager, Pwllheli and Portmadoc undertakings, Wales Gas Board; and MR. WILLIAM RICHARD TIZZARD, general foreman, Bristol/Bath Division, South Western Gas Board. Other Honours of interest to the gas industry include the award of K.C.B. to MR. HARRY WORK MELVILLE, Secretary, Department of Scientific and Industrial Research; and C.B.E. to MR. JOHN STODDART FORREST, Director-General, House Coal Distribution (Emergency) Scheme; MR. REGINALD RINGHAM, Chairman, East Midlands Division, National Coal Board; and MR. WILLIAM COLIN CAMPBELL ROSE, Assistant Secretary, Ministry of Power.

MR. R. H. THOMAS, O.B.E. (Member of the National Coal Board), has been appointed President of the British Tar Confederation for the year 1957-58. MR. L. W. BLUNDELL (Controller of By-Products, North Thames Gas Board) becomes *Honorary Treasurer;* MR. STANLEY ROBINSON (Chairman, Midland Tar Distillers, Ltd.), *Chairman of the Executive Board;* and SIR HENRY JONES, M.B.E. (Deputy Chairman, Gas Council), and Lt.-Col. P. F. Benton-Jones (United Coke & Chemicals Co., Ltd.), *Vice-Chairmen of the Executive Board.* MR. L. W. BLUNDELL (North Thames Gas Board) and Mr. E. E. Carey (South Eastern Gas Board) are among those representing the Association of Tar Distillers on the Executive Board. Representing the Gas Council on the Executive Board are Mr. S. Black (Northern Gas Board), Mr. R. N. B. D. Bruce, O.B.E. (North Thames and Eastern Gas Boards), Mr. D. D. Burns, O.B.E. (Scottish Gas Board), Mr. James Carr, O.B.E. (Southern and South Western Gas Boards), Mr. E. H. Harman (East and West Midlands Gas Boards), Mr. W. Hodkinson, O.B.E. (North Western Gas Board), Mr. W. K. Hutchison, C.B.E. (South Eastern Gas Board), Mr. A. McDonald (North Eastern Gas Board), and Mr. J. Powdrill, M.B.E. (Wales Gas Board).

MR. A. J. PARKER has been appointed Managing Director of Radiation Ltd. Mr. Parker, who was appointed to the Radiation Board in 1954, is a specialist in industrial management and has been actively concerned in production engineering for many years. MR. J. IVAN YATES, a Member of the parent Board, becomes Managing Director of a new Company—Radiation Group Export Sales Ltd.—which will take over the export selling activities of all the subsidiary companies in the group. MR. S. BURTON-SMITH has also been made a Director. The general offices of this Company are at 122, Kings Road, Chelsea, London, S.W.3. MR. F. A. HOOPER has asked to be relieved of his day-to-day duties, and has resigned from his position as Managing Director of Radiation Group Sales, Ltd., but will retain his seat on the Boards of Radiation Ltd., and Radiation Group Sales Ltd. MR. C. T. BAKER-CARR, a Director of Radiation Group Sales Ltd., will co-ordinate the activities of the Radiation Gas Group of Companies. MR. W. A. BALLARD will take over similar additional responsibilities in connection with the Radiation Solid Fuel Group of Companies. MR. ERIC BELLINGHAM, General Manager of Solid Fuel Appliance Sales, has been made a Director of Radiation Group Sales, Ltd.

Mr. A. J. Parker.

MR. R. F. HAYMAN, Industrial Gas Officer to the Gas Council, has been appointed Chairman of the Industrial Gas Development Committee.

COUNTY ALDERMAN H. SUTCLIFFE has been re-appointed Chairman of the North Eastern Gas Consultative Council.

Calendar & Directory

Alterations

The following changes have been notified recently. To keep the information in the current issue of the 'GAS JOURNAL' Calendar and Directory up to date readers are invited to note these alterations in the Directory Section.

Page D32.—ROTHERHAM DISTRICT: Delete J. W. Holroyd, *District M.*, retired.

Page D51.—BROMLEY: F. A. Timmins, *Station E.*, vice R. G. Plummer.

In the Supplement 'Noteworthy Dates' we regret that May 4 is given for the F.A. Cup Final; this should, of course, read May 3.

Obituary

SIR ANDREW CLOW, K.C.S.I., C.I.E., who was Chairman of the Scottish Gas Board from nationalisation until his retirement in April, 1956, has died aged 67. The last British Governor of Assam, Sir Andrew had a greater share in improving labour conditions throughout undivided India than any contemporary member of the Indian Civil Service. He was engaged on this work throughout 18 years; and took up his appointment of Governor of Assam in 1942; for a few months in 1946 he acted as Governor of Bombay. After retirement from the I.C.S. he did much public service, and in 1947 and 1948 represented the United Kingdom on the United Nations Commission for Asia and the Far East. In a tribute to his predecessor, Mr. Sydney Smith, present Chairman of the Scottish Gas Board, says: 'Sir Andrew was a man of many parts and high principles, with standards of ethics and integrity that were brought to bear on all things to which his influence was directed. His wide experience of the Civil Service and as a legislator had a marked influence on the form of organisation created during the earlier years of nationalisation to plan and administer the affairs of the Scottish Gas Board, towards the progress and future success of which he exercised his many talents. A man of quiet and unassuming personality, but of ready wit, Sir Andrew endeared himself to those with whom he came into more intimate contact, and his untimely death is a matter of deep and sincere regret to all members, officers, and staff of the Scottish Gas Board.'

Diary

January 11. — EAST OF SCOTLAND JUNIORS. Dundee. Short paper day.

January 15.—EASTERN JUNIORS: Visit to the Stanton Ironworks Co., Ltd.

January 16.—INCORPORATED PLANT ENGINEERS: Blackburn. 'Fuel and Power Policy,' Gerald Nabarro, M.P. Lecture Hall, 7.30 p.m.

January 17.—INCORPORATED PLANT ENGINEERS: Birmingham. 'Fuel Injection,' T. G. Charlesworth. Imperial Hotel, Temple Street, 7.30 p.m.

January 18. — YORKSHIRE JUNIORS: Wakefield. Short paper day. 'Some Comments on the Use and Value of the Specification,' K. O. Golisti; 'Pumping Holder Syphons,' A. Stubbs; 'Education and the Gas Industry,' L. Howson.

January 20.—WEST MIDLANDS G.C.C.: Birmingham: Meeting at 2.30 p.m.

January 21.—LONDON AND SOUTHERN SECTION: 'The Construction of a Welded Gasholder and Tank,' R. F. Robinson and W. Simpson. Pepys House, 14, Rochester Row, Westminster, S.W.1, 2.40 p.m.

Miners to Seek Gas in Place of Concessionary Coal?

AN estimated 40% of the 2,800 miners at Manvers Main colliery, Mexborough, Yorkshire, live in post-war council houses with only one coal burning grate. To many this means they cannot burn all the ten tons of concessionary coal they are allowed each year under their agreements.

Mr. Jim Randerson, National Union of Miners' Branch Secretary at the colliery, a member of Swinton Urban Council and a former Chairman of the Housing Committee, says it is likely that the men will seek a national agreement entitling them to have concessionary gas or electricity instead of part of their entitlement of coal. 'I think a resolution on these lines will be formulated by the branch for the 1958 N.U.M. National Conference,' he said.

Mr. Randerson says that men take an average of about 80% of their coal entitlement and the rest is sold back to the National Coal Board at £1 per ton. 'If the Coal Board would pay the men more for the coal they do not take, I think it would encourage them to be more economical and would result in their taking even less of their entitlement —all to the advantage of the Board," Mr. Randerson said.

Asked if he would be willing to exchange £1 worth of gas or electricity for one of his concessionary tons of coal, a miner said: 'No! The ton of coal is worth £5 to the Coal Board so they can afford to give us more than the equivalent of £1 in gas or electricity.'

Women's Gas Federation

Bradford's Clean Air Lead Praised

SPEAKING at the twenty-first anniversary celebrations of the Bradford branch of the Women's Gas Federation at Fountain Hall, Bradford, recently, Mr. G. E. Currier, Deputy Chairman of the North Western Gas Board, said that Bradford Corporation had set an example to the country in the setting up of smokeless zones.

Good Friends

The Women's Gas Federation had proved good friends to the gas industry by collecting and submitting the women's point of view on gas and gas appliances.

The guest speaker was Dr. Phyllis Bentley, who spoke about the Brontë family. Other speakers included Miss J. Frith (General Secretary of the Federation), Mrs. G. L. Garbutt (President of the Bradford branch), Mrs. E. Saville (Chairman of the Bradford branch), and Mrs. F. Pickles (past President of the Bradford branch).

NEWCASTLE OFFICE FOR CAPE ASBESTOS

THE Cape Asbestos Co. Ltd. (Mr. F. S. Page) and their subsidiary Cape Building Products Ltd. (Mr. M. W. Brodie) have opened a new office at 19 & 20, Exchange Buildings, Quayside, Newcastle-upon-Tyne. Telephone: Newcastle 20488.

The Newcastle office is part of the Cape Asbestos Northern Area which is served by Mr. J. F. Callaghan, Northern Area Manager, from Manchester. The Cape Building Products Northern Area Manager is Mr. J. A. Fitzpatrick. The new office will enable both companies to provide an improved service to customers on the North East Coast.

Powell Duffryn Ltd.

The Directors of Powell Duffryn Ltd., have declared an interim dividend of 6% actual, less tax, on the 9,660,471 Ordinary shares of 10s. each in respect of the year ending March 31, 1958.

Sir George Godfrey & Partners

'A SATISFACTORY STATE OF AFFAIRS'

PRESENTING 'a satisfactory state of affairs,' Mr. W. D. L. Theed, Chairman of Sir George Godfrey and Partners (Holdings) Ltd., said at the annual meeting that the results of the Group for the year ended August 31, 1957, showed that the combined profits before taxation had increased substantially over the figures for the preceding year—£688,426 as against £521,333. This was reduced by taxation to £325,466 compared with £237,406 last year.

Having regard to the present economic situation in industry, continued Mr. Theed, the Directors considered that the rate of dividend on the Ordinary shares should remain at 22½%, thus maintaining the rate already paid each year since the offer for sale in July, 1955.

BIRLEC ENTERS CANADIAN FIELD

BACK in Britain after three months in Canada studying trade conditions and future prospects, Mr. K. J. Palmer, London Office Manager of Birlec, Ltd., is enthusiastic about future prospects in the Dominion.

An office of the Company has already been established in Toronto under the supervision of Mr. Palmer, and depending on the outcome of his visit, there is a possibility that the Birmingham firm will manufacture furnaces in Canada.

International Kitchen Club

Hostess to the International Kitchen Club last month was Dame Vera Laughton Mathews, Adviser on Women's Affairs, Gas Council. Attendance included representatives from America, Australia, Belgium, China, Denmark, France, Germany, Greece, India, Indonesia, Italy, the Netherlands, Pakistan, Portugal, and Spain. The cameraman caught Sir Henry Jones, Deputy Chairman, Gas Council, in the left background. The ladies are, left to right, Mrs. Tom Burns (Spain), Miss Elinor Gordon (Australia), Miss V. Walton Jones (U.S.A.), Mrs. Chan Stirling (China), and Mrs. Azhar (Pakistan).

A GAS COUNCIL AMATEUR DRAMATIC SOCIETY PRODUCTION

Lord Arthur Savile's Crime was well acted, fast moving

THE foggy night of December 4 did nothing to mar the Gas Council Amateur Dramatic Society's production of 'Lord Arthur Savile's Crime'—except to keep away some of the audience from a well-acted, fast-moving play which can best be described in the author's own words as 'an improbable comedy.'

Lord Arthur Savile, played by Frank Edwards of the North Thames Gas Board, on the eve of his marriage to Sybil Merton (Mary Duggan), is introduced by Sybil's mother, Lady Julia (Peggy Clarke), to a fortune teller (Hedley Parker) who tells Lord Arthur that sometime in his life, he must commit a murder.

The Decent Thing

To do the decent thing, Lord Arthur decides that if murder he must, it will be before the marriage which he can then enter with a 'clear conscience.'

His schemes and efforts, readily aided and abetted by Baines, the butler, played by Ronie Herberte of North Thames, and a professional anarchist, Herr Winkelkopf (Bill Quinlan), to 'bump off' various relatives, with usually dire results to himself, is, indeed, 'an improbable comedy' in every sense.

In her play, Constance Cox captured the witty dialogue from Oscar Wilde's story on which she based it. Indeed, it was difficult to believe that this was not an original Wilde play. It was the Society's first excursion into a period costume and was extremely well received by the audience.

To single out players for special mention is invidious, for indeed there was not a part which did not have its moments. But for feats of memory, for they were hardly off the stage, Lord Arthur and Baines must be congratulated. Mary Duggan proved an alluring Victorian maiden, Herr Winkelkopf really sounded the part, and Lady Julia was one of those terrifying 'battleaxes' one sometimes meets.

The play was produced by Tommy Cooke and well stage managed by Joan Plank and Marjorie Woodman.

Two of the relatives Lord Arthur tried to dispose of: Lady Windermere, played by Margaret Beavan, and the Bishop of Paddington, played by W. D. Scott-Wilson.

N. Ireland 'Integration' Plan Considered Too Expensive

AFTER hearing a report from the Gas Manager (Mr. J. A. Derbyshire) Bangor (Co. Down) Borough Council have decided that a plan to obtain a supply of gas from Belfast cannot be considered economically feasible.

The Council, faced with a bill estimated at £95,000 for the replacement of plant at their gasworks had been exploring the possibility of obtaining a bulk supply from Belfast. They will now go ahead with plans to replace their plant after a deputation has met Ministry of Commerce officials to discuss the scheme.

17-mile Main

In his report to the Council's Gas Committee, Mr. Derbyshire stated that in order to receive a bulk supply from Belfast a 12-in. main would have to be laid for a distance of 17 miles at a cost of £150,000. Taking everything into consideration the price of gas would be much higher than if it were produced in Bangor.

Mr. Derbyshire further stated that if a supply of gas were to be maintained, an early decision was necessary as the removal of obsolete plant would take three months.

Gas Lights Go Out in Leeds and Belfast

AN £80,000 street lighting programme has been recommended for approval by the Leeds Corporation Street Lighting Committee. It provides for more than 3,300 new electric lamps to replace gas lamps.

On the other hand it has been estimated that it will be 16 years before Leeds is finally converted from gas lamps to electric lamps.

Gas light, which illuminated the streets of Belfast from 1823, has now given place to electric fluorescent lighting in the city centre. All gas lighting, involving 16,232 lamps, will disappear from the city in the next two to three years.

Musical Flames Skiffle Group

THE Midland Section of the Institution of Gas Engineers has arranged a 'Christmas Scientific Lecture' for sixth form pupils of Birmingham grammar schools at the College of Technology, Birmingham, this Friday. The lecturer will be Mr. Frank Brinsley, Technical Sales Manager of a well-known firm.

His subject will be 'Flame' and he will devote most of the time to demonstrations of the many usual and unusual uses of flame. In the latter category will come some light-hearted business, including 'Musical Flames' and a 'Flame Skiffle Group.'

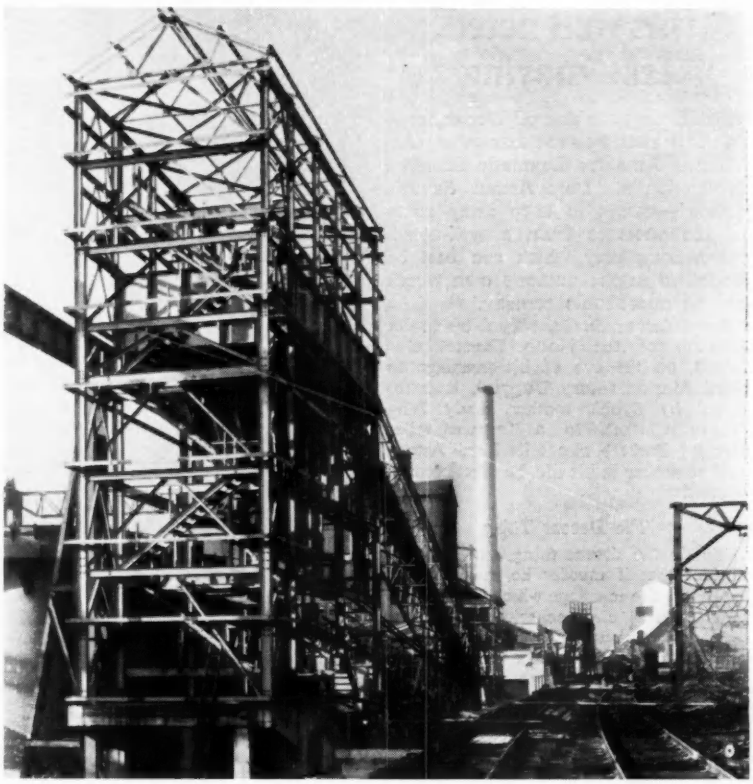
£500,000 Mechanical Handling 'Jig-saw' Aids Modernisation at Sheffield

AN intricate £500,000 system for handling coal, coke, coke breeze, and oxide has been fitted like a jig-saw into a site of 12½ acres to help modernise the gasworks at Neepsend, Sheffield.

When the rest of the modernisation programme is complete in about a year's time, the works will be one of the largest in capacity in the East Midlands. It will purify and distribute a total of some 34 mill. cu.ft. of gas per day—21 mill. cu.ft. produced at the works, plus about 13 mill. cu.ft. of incoming coke oven gas—on a site a good deal smaller than usual for a works of this calibre.

Long conveyors, gantries, and transfer towers had to be fitted, with only inches to spare, between the existing buildings and railway embankment.

'The most valuable erection, too, might have been a shoe-horn,' one engineer reported. Passengers on the Manchester to Sheffield line have been interested spectators as the work advanced.



Coke wagon loading plant under construction—part of the new £500,000 mechanical handling plant installed by Humphreys & Glasgow, Ltd., at Neepsend. A section of the coal handling plant can be seen in the background.

Built for the E.M.G.B.

The handling system was designed and built for the East Midlands Gas Board by Humphreys & Glasgow, Ltd., who are also in charge of the National Coal Board's underground gasification scheme at Newman Spinney, near Chesterfield.

The Neepsend gasworks was built in 1852. Modernisation work, eventually resulting in a completely new installation, was begun by the Sheffield Gas Company in 1949, and continued after nationalisation by the Sheffield and Rotherham Division of the East Midlands Gas Board.

The first and most impressive stage—the mechanical handling system—is now almost complete and is partly in operation.

There are eight vast concrete storage bunkers for coke, built partly underground. They are 325 ft. long, 75 ft. wide, 75 ft. deep (of which 30 ft. are below river level), and hold 8,500 tons.

The plant which introduces coal into the gasworks and which is now operating has been fitted between a high level railway embankment and existing retort houses which have been rebuilt and modernised. Incoming coal can now be conveyed direct to the retort houses or into stock, and can be reclaimed from stock at two different positions.

Travelling gantry and conveyors for filling oxide purifier boxes—part of the new £500,000 mechanical handling plant installed by Humphreys & Glasgow, Ltd., at Neepsend.

A coal breaker incorporated in the system enables 12 in. pieces to be broken down to 1½ in. in size when run of mine coal is introduced into the works; provision is also made for pulverising the coal to ⅛ in. in size for quality blending.

Screening Plant

After carbonisation the resultant coke is cut and graded in a screening plant, which went into operation in 1954 and was installed on existing reinforced concrete bunkers. Graded coke is despatched from beneath these bunkers for distribution into three separate coke handling systems.

By a series of belt conveyors at present under construction certain grades of coke will be elevated to the high level embankment and loaded into wagons for distribution by rail. A second series of conveyors elevates suitably graded coke to a Humphreys & Glasgow carburetted water gas plant installed in 1951.

One of the long coke conveyors which form part of a new £500,000 mechanical handling plant installed by Humphreys & Glasgow, Ltd., at Neepsend.

A final series of conveyors transports the graded coke to the 8,500 tons concrete storage bunkers. These large bunkers greatly improve the coke stocking facilities at the works and allow the maximum use to be made of the rather limited ground area available.

Graded coke reclaimed from beneath the storage bunkers is elevated and conveyed to steel landsale bunkers beneath which debreezing takes place prior to bulk lorry loading or bagging for distribution by lorry. Coke breeze from this operation is conveyed to a further bunker ready for disposal by road. This comprehensive coke and breeze handling system is nearing completion and will be in operation shortly.

A further new handling plant provided for the existing purifier box installation includes a 3-ton overhead travelling grabbing crane, 63 ft. span Goliath type travelling gantry and rubber belt and *en masse* type conveyors.

Due to commence operation early in 1958, the plant will speed up and simplify the filling of the purifier boxes with fresh oxide and disposal of the oxide when spent.

All conveyors, except those fitted with travelling trippers, are in totally enclosed bridges with asbestos roof and side sheeting, fitted with Perspex slits for natural lighting. There are timber walkways on one side of conveyors, and in all junction towers and houses.

Conveyor drive units consist of Lancashire Dynamo & Crypto motors, David Brown 'Radicon' work gear reducers, with fluid and flexible type couplings. Mavor & Coulson troughing and return idler sets are fitted, and are rubber covered where handling coke. Underneath load points on the coal handling plant conveyors impact idlers are fitted.

Electrically Interlocked

All chutes on the coal handling system have a minimum angle of 55° to the horizontal because they handle slurry on occasions, and are lined with M.S. plate. The chutes handling coke are basalt tile lined. All systems are electrically sequence interlocked.

The civil sub-contractors were—coal handling plant, George Longden & Son, Ltd., Sheffield; coke handling and oxide handling plant, Holst & Co. Ltd., London; and wagon loading plant, the Yorkshire Hennibique Contracting Co., Ltd., York.

New Engine Works like 'Push-and-Go' Toy

ELECTROGYRO'S ENERGY IS STORED IN TWO 1½-TON FLYWHEELS

THE National Coal Board have developed a novel type of shunting locomotive which is now undergoing surface trials at Seaton Delaval in Northumberland. Known as the electrogyro locomotive it derives its power from two large flywheels which rotate at speed to store energy which is then converted into electrical power and used to drive the locomotive.

The principle employed is similar to that used in a child's 'push and go' toy. An electrical charge is supplied from a contact mast and through two induction motors. These start the flywheels storing kinetic energy. When the locomotive moves the reverse happens; the stored energy being drawn off in the form of electric power by the two traction motors which turn the road wheels.

It takes about 2½ minutes to speed the gyros enough for about 30 minutes' operation. This corresponds to the usual haulage duty required in the mining industry of a short run followed by a stop. If the system and equipment prove to be technically and economically sound they offer the possibility of hauling underground trains with improved efficiency and the construction of an underground gyro locomotive will be considered.

In the present trials, three charging stations are being used; one in the locomotive shed, and two, about a mile apart, on the track. When the locomotive is at a charging mast a collecting pole is swung out pneumatically connecting up with four bare contact rails which are not alive until a pilot circuit closes in the charging station. When the mast is swung back the locomotive can move off.

The electrogyro is about 24 ft. long and weighs 34 tons; the flywheels are a little over 5 ft. in diameter and weigh about 1½ tons each. The stored energy of the gyros at maximum speed is 9 KWh and they are cooled by hydrogen.

The electrical equipment was produced by the Swiss firm of Oerlikon and the mechanical parts were built by Sentinels of Shrewsbury.

TEN W.M.G.B. LONG SERVICE AWARDS

PRESENTATIONS were recently made to ten employees of the West Midlands Gas Board in Wolverhampton, by the Chairman, Mr. G. Le B. Diamond. Between them they had given more than 500 years' service to the gas industry.

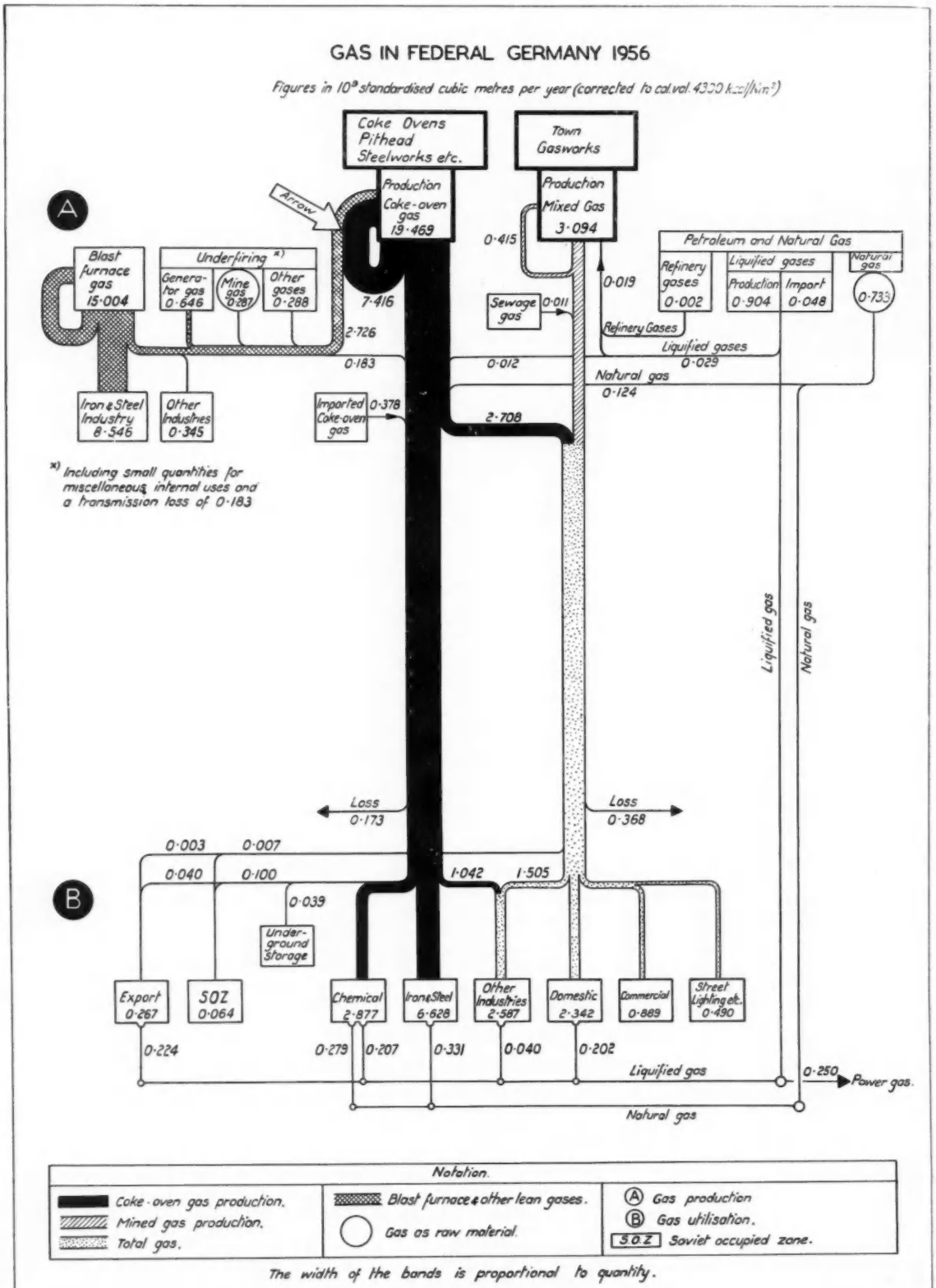
Each received a certificate commemorating half a century's service in the gas industry and a gift of his own choice. One of them, Mr. George Hughes, inspector of plant in the distribution department of the Birmingham Division, started in the fitting department of the former Birmingham Corporation gas undertaking in 1908.

Gift to University

THE Council of the University of Leeds has received the gift of £3,500 from the British Coke Research Association for the Houldsworth School of Applied Science.

Effluent Problem

Kirkcaldy Town Council has approved a resolution prohibiting and inter interdicting the Scottish Gas Board from discharging effluent from the gasworks into the Corporation's sewers.



This flow diagram of gas in Federal Germany is explained in the article beginning on the next page.

GAS IN FEDERAL GERMANY

FOLLOWING are excerpts from a very full survey of the development of gas supply and consumption in Federal Germany during 1956 published in the September 27, 1957, issue of *Gas und Wasserfach*.

The overall picture is given in the table, and particularly in the flow diagram opposite, with corresponding English figures in the table. The flow diagram shows the proportions of the several sources of gas supply and their combination in the satisfaction of the demands of the wide variety of consumers. It shows very clearly the highly interlinked nature of the industry—its close ties with iron and steelworks, the coke ovens and chemical works of the Ruhr and the Saar and the close integration of by-product coke ovens and town gas production.

Sources of Supply

Sources of supply are shown at the top of the flow diagram, marked A—consumption is set out at the bottom, marked B. Supply comes from coke ovens at pithead and at the iron and steelworks, from town gasworks and oil refineries supplemented by a small but growing quantity of natural gas.

Approximately 80% of the gas used is obtained from the coke ovens. Here, the heating gases (underfiring) are particularly important; rich gas, producer gas, and blast furnace gas, in varying proportions. The large quantity of rich gas still used for this purpose is indicated by the arrow; here, there is a considerable reserve which can be liberated as required for further development in town gas supply.

A total of 288 town gasworks supply 20% of the gas used. Gas from mineral oil (liquefied or L.P. gases) and natural gas reach the consumer either (to a small extent) direct, or mainly through the gasworks or coke oven undertakings. Town gasworks also take up oil, gas and refinery tail gases—natural gas supplies are expected to reach them during the present year.

Industrial Importance

Some of the coke oven gas goes to town gas supply, but most of it is supplied direct to industrial users especially steel and chemical works. Town gas, supplemented by coke oven gas, is used mainly by householders and commercial consumers. The flow-sheet shows the overall importance which gas has assumed today in industries beyond the domestic market. The demand is covered by an ever increasing number and variety of raw materials or processes.

A number of increases took place from 1955 to 1956 under different headings:—

Coke production in coke ovens increased by 7.8% against an increase of coal products of only 2.8%. Coke oven gas production increased by 5.5%.

Town gasworks increased the amount of gas supplied from their own production by 4.9%. Over 50% of the gas supplied through town gas systems came from coke ovens, making one-fifth of the total coke oven gas produced. The total amount of gas supplied through town gas systems amounted to 277% of that supplied 20 years previously, i.e., 1936.

Of all gas made 98.3% was derived from black coal, the remaining 1.7% was derived from oil, liquefied (L.P.) gases and sewage. Coke production for sale increased by 17.2% representing a total of about 3 mill. tons of fuel for domestic and other small users. Consequent upon the increased use of rich gas as underfiring coke sold as a percentage of coal used has increased from 47.6% in 1950 to 59.6% in 1956.

Industrial and commercial consumption of gas has grown more quickly than domestic consumption, 15.9% against 7.9%. The average income from gas sold has therefore suffered owing to the lower price at which gas is sold to industrial and commercial consumers, and this in spite of an average increase in tariffs.

Domestic and industrial loads are relatively steady (90 to 110% of average monthly consumption) whereas the demand of commercial consumers fluctuates between 70 to 140%.

Since 1953 a small but noticeable increase in the consumption of oil and liquefied (L.P.) gases has taken place, with on the one hand greater flexibility and on the other, an increased availability of (bottled) gas outside the districts covered by gas mains.

GAS PRODUCTION and UTILISATION in 1956

Quantities corrected to cal. val. 4,300 kcal per cu.m. at 0°C. 760 mm.
(450 B.Th.U. per cu. ft. at 60°F. 30 in. sat.)

	Millions of cu. m. NTP dry	Millions of cu. ft. 60°F. 30 in. sat.	Compared with 1955
PRODUCTION			
1. Coke Ovens	20,115	761,960	+ 7·0%
2. Town Gasworks	3,094	117,200	+ 9·7%
3. **Total**	23,209	879,160	+ 7·3%
DRAWN FROM OTHER SOURCES			
4. Imported	378	14,320	+ 9·5%
5. Sewage gas	11	420	+ 12·0%
6. Miscellaneous			
(a) Mine gas	287	10,870	+ 29·9%
(b) Blast furnace gas	1,700	64,390	− 3·5%
(c) Natural gas	124	4,700	+265·0%
(d) Other gases	288	10,900	+ 3·2%
(e) **Total**	2,788	105,600	+ 5·2%
7. **Total** (3+6e) production and other sources	25,997	984,760	+ 7·0%
USED IN PRODUCTION			
8. In Coke Ovens—			
(a) Underfiring	8,665	328,230	+ 6·4%
(b) Other works purposes	1,477	55,950	+ 21·3%
(c) **Total**	10,142	384,180	+ 8·3%
9. In Gasworks—			
(a) Underfiring	370	14,010	+ 66·2%
(b) Other works purposes	44	1,670	+ 3·0%
(c) **Total**	414	15,680	+ 56·0%
10. **Total used** in Production (8c+9c)	10,556	399,860	+ 9·6%
11. **Net Total** (7–10)	15,441	584,900	+ 5·5%
12. Export	107	4,050	
13. Losses	542	20,530	
14. From underground storage	39	1,480	
15. **TOTAL available** 11—(12+13+14)	14,753	558,840	+ 4·9%

UTILISATION (Gas sent out)

	Millions of cu. m.	% of total consumption	Millions of cu. ft.	Compared with 1955
To—				
1. Iron production	5,474·6		207,380	+ 3·2%
2. Iron manufacture	821·9		31,130	− 8·0%
3. **Total** iron industry	6,296·5	40·8	238,510	+ 1·6%
4. Non-ferrous metals	189·9		7,190	+ 0·9%
5. Chemical industry	2,391·4		90,590	+ 4·0%
6. Glass and ceramics	639·1		24,210	+ 3·5%
7. Other industries	1,599.2		60,580	+20·0%
8. **Total** miscellaneous industry	4,819·6	31.2	182,570	+ 8·7%
9. Domestic	2,139·5	13·9	81,040	+ 7·9%
10. Commercial	888·9	5·7	33,670	+ 4·9%
11. Public Institutions	193·7	1·3	7,340	+16·0%
12. Street lighting	229,8	1·5	8,700	+ 7·1%
13. Miscellaneous consumers	185·3	1·2	7,020	−15·6%
14. **Total** domestic, etc.	3,637.2		137,770	
15. **Total** consumption	14,753·3		558,850	+ 4·9%

Overall results are summarised in the table and on the diagram. The original table contains similar figures for the years from 1950. It shows that the net quantity of gas available for sale increased from 9.1 milliards (10^9) cu.m. in 1950 to 15.4 in 1956. Apart from a temporary stagnation in 1953 the increase was steady at the rate of about 10% per annum.

Turning to the future, following the statement made by the Minister of Economics in the Federal Parliament on June 24, it appears that still greater emphasis will be placed in the immediate future of the fuel industries upon the upgrading of coal through carbonisation in an effort to cover a greater proportion of national power requirements from indigenous resources. Costs will largely influence the proportion of these which will be covered by the gas industry. Competition is increasingly fierce and it is noted that some reduction in cost was achieved during 1956; more will be necessary and it is thought that this can be achieved by concentration of manufacture in bigger units and still greater integration in supply.

A point which is not brought out is that, for comparison with our own gas sold of 2,607 mill. therms (which reduced to 450 B.Th.U. per cu.ft. is about 579,000 mill. cu.ft.) the German figure of 558,850 should be reduced by nearly all of the gas used in iron production and manufacture. Possibly the equivalent German total is in the neighbourhood of 320,000 mill. cu.ft.

LP Gas Storage Project

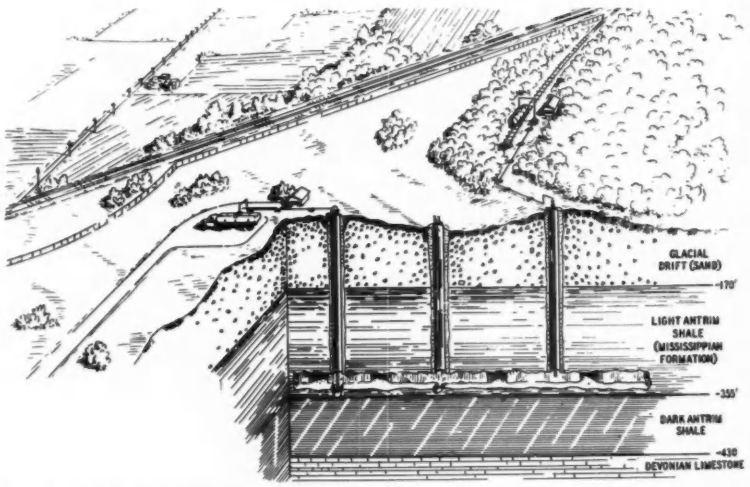
From Hilding Carlson

AN extensive liquefied petroleum gas storage project is to be started by an American gas undertaking. A honeycomb of chambers will be mined out of solid rock at the 350 ft. level by Northern Indiana Public Service Company, near La Porte, Indiana, for storage of approximately 300,000 barrels of liquefied petroleum gas. The total heating value of the stored liquid, after vapourisation, will be in the order of 12 mill. therms. Work on the project is expected to continue for 18 months after it starts early in 1958.

Each of the chambers will be 30 ft. high, 20 ft. wide and 30 ft. long. They will be mined with substantial supporting walls of the rock structure between them but will be interconnected by tunnels so that the liquid level and pressure will be equalised throughout.

Two months of core testing showed that solid rock in the area started at the 185 ft. level and continued to at least 596 ft., the deepest point of testing.

Vertical shafts, 42 in. in diameter, will be sunk to the 350 ft. floor level as the first construction step. Men and disassembled equipment will pass through the shafts during the construction period. When all sub-surface work has been completed, the shafts will be sealed around the service piping through which the liquefied petroleum gas will be pumped into and out of storage.



Liquefied petroleum gas storage caverns to be built by Northern Indiana Public Service Company near La Porte, Indiana, will have an estimated capacity of 300,000 barrels as protection that will ensure continuity of service to the undertaking's customers. With a floor at the 350 ft. level, each chamber will be 30 ft. high, 20 ft. wide, and 30 ft. long. The chambers will be interconnected. Liquefied petroleum gas will be pumped down and withdrawn through piping to be installed in the 42 in. shafts that will be used first during construction, largely a mining operation. The project will require 18 months of underground work.

The storage area includes 40 acres adjacent to a main line railway, thereby facilitating tank-car deliveries. Motor deliveries also are anticipated. Similarly, when withdrawals from storage are to be made, rail and motor transport will deliver the liquid to the undertaking's vapourising and mixing plants in East Chicago, South Bend and Fort Waynes, all in Indiana.

The Northern Indiana engineering department is preparing detailed plans for the project and will require at least two months for their completion.

Demolition of Loughborough Works Begins 21 years after Opening

THE retort house and gas-making plant at Loughborough, Leics., gasworks, are being demolished, 21 years after their official opening by the Lord Lieutenant of Leicestershire.

When built, the works was of the most modern design of the times, and Loughborough Corporation, which then ran the undertaking, spent £25,000 on its construction. According to an expert estimate, today the figure would be about £100,000.

Johnson (Loughborough) Metals Ltd. began work on the clearance project last month. It is expected to take about six months.

The plant was last used in 1955 since when gas has been supplied from the grid. Parts of the equipment were made specially for the Loughborough works and could not be put into use elsewhere, although other parts have been transferred to undertakings which could use them.

More Gas Fired Kilns

To reduce the smoke nuisance attached to limestone works, Settle Limes, Ltd., plan to install another two gas-fired kilns at their Horton-in-Ribblesdale works.

S.G.B. Training and Education Schemes

'Battleground' Constructed for Mains and Service Layers

INTENSIVE COURSE FOR SALESMEN

THE need for training and education of employees if they are to give the customer the best possible service and the employer the most efficient—and economic—staff is fully realised by the Southern Gas Board. To this end it has drawn up a most comprehensive scheme, which has recently been launched by the Training and Education Officer, Mr. D. L. Hill.

For example, every salesman from all the Board's 100 showrooms is taking part in one of the intensive one-week's residential courses in salesmanship—for, as the Board's Chairman, Mr. C. H. Leach, says: The gas industry must 'apply every acceptable modern technique in presenting products and services to the public. First-class salesmanship is an essential.'

Same Approach

On another side of the industry's activity—the laying of mains and service pipes—the same fresh and comprehensive approach to the problem is evident. What is familiarly known as 'the battleground' has been constructed at the training site, a piece of ground on which all the methods of practical mains and service laying are demonstrated, and those members of the Board's staff who come to the 'school' can themselves undertake any of the wide variety of tasks likely to be encountered in the course of their daily work.

The Board's training and education scheme is based on programmes drawn up at the area departmental headquarters at Bourne Valley, Branksome, Poole, Dorset, under the supervision of Mr. D. L. Hill, who, before his appointment to this present post in 1956, was for six years Assistant Industrial Relations Officer of the Gas Council. The courses can be divided into six main categories:

Internal Training

1. Internal training, providing either initial, refresher or specialised training in subjects not adequately covered by courses available elsewhere. The courses at present being held for salesmen and for mains and service layers are examples.

2. Apprentice training, in which, in collaboration with the local education authorities, comprehensive craft training to the examination levels is given to all gas fitting apprentices in the Board's area. The training is given at Poole, Southampton, Portsmouth, Reading, and Oxford.

3. Part-time training, either through correspondence courses or through part-time courses run by local education authorities; opportunities are offered to employees anxious to improve their qualifications in subjects where this increased knowledge would be of value to the Board.

4. Training on the job—every encouragement is given to supervisors to see that training in specialised skills and knowledge of new techniques, appliances and equipment, is passed on to all employees in the course of their duties.

Outside Agencies

5. Training by outside agencies, wherever possible, arrangements being made whereby employees can attend courses run by professional, industrial or educational bodies, in order that employees of the Board can have the advantage of the latest available training and information in special subjects.

6. Selection of employees—through liaison with schools and educational organisations throughout the area, and by the introduction of special selection techniques, the Board is attempting to secure the most suitable recruits for its staff.

It is widely considered in the gas industry that there has been all too little emphasis in recent years upon positive salesmanship, and that much needs to be done to imbue the sales force with the approach and the drive that wins sales. This is certainly the view of the Southern Gas Board, and it was their aim to give every salesman in their area the opportunity of taking part in the series of one-week intensive residential courses in salesmanship which are now being completed at Bourne Valley.

Recognised Expert

It has involved putting about 250 men—of varying ages and length of experience—through the course, about 20-25 taking part each time. Responsibility for a large part of the course is taken by Mr. Charles C. Knights, author of the Gas Council's recently published 'Sales Training Manual,' recognised expert in all the problems of salesmanship and sales management. Other lectures are given by leading officials of the Board itself, including the Commercial Manager, Publicity Manager, and Purchasing Officer.

The course always concludes with an 'open forum' when those present have an opportunity of putting questions which have arisen during the week to Board officials and discussing them freely and frankly. It has been the practice for those who have taken the course to be asked to complete—anonymously—a questionnaire which enquires, among other matters, into the value they consider the course to have been to themselves and their colleagues.

So far, the vast majority of those taking part have warmly supported the value which the Board believes the course to have. They have also been able, as a result of completing the questionnaires, to put forward suggestions which have proved of value in later courses.

Two-week Course

The course for mains and service layers is also a residential course at Bourne Valley, but in this case of two weeks' duration. It may not be possible for all the distribution staff in the Board's employ to take the course, but all mains and service layers will do so. Already about 200 men—again of widely varying age and experience—have been at Bourne Valley for this.

The course includes such activities as excavating, trench cutting, back-filling, the making of joints, laying of pipes, testing and repair of mains, locating stoppages or the presence of water, the use of breathing apparatus, and general training in safety precautions. The course is under the general supervision of Assistant District Engineer (Instructor) J. Symes, and it is designed for about 14 men at a time. Good use is made of films and film strips during the courses. One strip—on the correct use of the short distance fresh air breathing apparatus—was specially prepared from photographs taken at Bourne Valley.

Rare in Industry

It is for this course that the specially-designed training ground was erected at Bourne Valley. Such training grounds are still rare in the industry, and the Southern Board's is claimed to be one of the most up to date in existence. It includes all types of pipe likely to be encountered in the layer's work, and the various items of road and street 'furniture and fittings.'

The use of the premises at the Bourne Valley works for the headquarters of the Board's training and education department is an admirable example of converting into a positive as . a site which had been partly redundant for many years. It was first used for gas production in about 1860, but, owing to other developments in the area, ceased to be used as a manufacturing station in the early 1920's. The old retort house has been used as the 'frame' into which have been fitted the administration offices of the department, a large gas fitting workshop, two modern lecture rooms and a common room for the students. The training ground for the mains and service layers' course is on an adjacent site.

Canteen facilities are available for meals during the day, and there is a wide variety of accommodation available in the neighbourhood for those taking part in the residential courses. Many are able to take advantage of 'bed and breakfast' arrangements with pensioners of the gas industry, or widows of former Board employees.

W-D INTRODUCE GAMMA INTERLOCK

New Safety Equipment for Coke Oven Operation Overcomes Difficulties Due to Dirt and Smoke

THE normal operation of pushing a horizontal coke oven requires both doors to be removed and the coke guide and hot coke car to be correctly aligned with the oven to be pushed. The coke guide and hot coke car are situated on the opposite side of the battery to the pushing machine and cannot be seen by the pushing machine operator.

It has been the general practice for this operator to depend on a series of hooter signals to advise him when everything is ready for pushing the oven. Normally this system works successfully. However, mistakes can be made which may have serious consequences such as danger to the personnel or loss of output.

For some years now attention has been focused on the need of a signalling and interlocking device between the pushing machine and the coke guide (and, if desired, the coke car) whereby:

(i) The ram is prevented from pushing the coke from the oven unless both the oven doors have been removed and the coke guide and coke car are correctly located, and

(ii) the movement of the ram through the oven can be instantaneously stopped from the coke guide (or coke car) in case of emergency on the coke side of the oven.

Probably the best known interlocking device for pusher and guide is an electrical one and consists of contact studs arranged in pairs at coke and pusher sides of each oven and connected across by cables. Wiper collectors on the pusher and guide make a through electrical circuit across the battery only when both machines are aligned on the same oven.

The circuit is arranged in its simplest form with a push-button switch on the coke guide which enables the guide operative to give the signal to 'push' by a light signal in the pusher cabin, at the same time a relay-operated switch is closed on the ram forward travel motion.

Should any emergency occur on the coke side the forward travel of the ram may be stopped by the coke guide man pressing a 'stop' button. Such devices have been fitted to many coke oven plants and by and large they are reasonably successful.

Considerable Maintenance

However, the amount of electrical wiring and contact studs is considerable for a large battery. Furthermore, in order to ensure maximum reliability in operation which is a *sine qua non* for any safety device considerable maintenance is involved in the cleaning and adjustment of the contact studs and wipers which quickly become dirty under the conditions prevailing on a coke oven battery.

Other systems employ compressed air pipes across the coke oven battery, with hose connections to the machines. These systems again depend for their reliability on maintenance of hosing connections and clearance of blockages in the air lines.

The crux of the problem is to devise a simple and reliable method of signalling from the coke guide to the pushing machine at each individual oven. One means of eliminating the multiplicity of wires or air pipes connecting the two ends of each oven is to use a lamp on the coke guide to send a light beam through the roof space of the oven or across the top of the battery on to a photo-electric cell on the pushing machine.

Unfortunately, light rays have little penetrating power and can easily be interfered with by objects or even smoke on the top of the battery or, in the case of the beam which flashes through the roof space, by roof carbon or loose coke.

A new device which employs a gamma beam has recently been introduced into this country by the Woodall-Duckham Construction Company who have acquired the world rights outside the Union of South Africa. This device, which is the subject of British and overseas patent applications, is the invention of Dr. J. Zawels, an engineer of the South African Iron & Steel Corporation and has been in operation at the Pretoria coke oven installation since May, 1956.

The first installation in the United Kingdom is at work at the Monkton (Durham) coke oven plant of the National Coal Board. The device employs a radio-active isotope mounted in

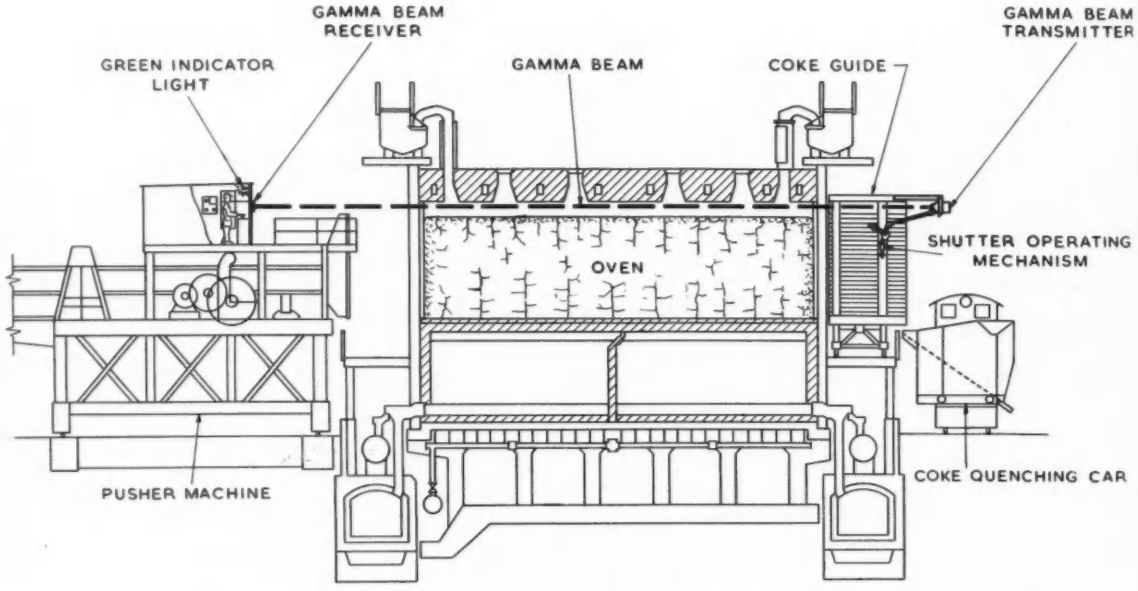


Fig. 1. Sectional diagram showing the W-D Gamma Interlock in operation on a coke oven battery.

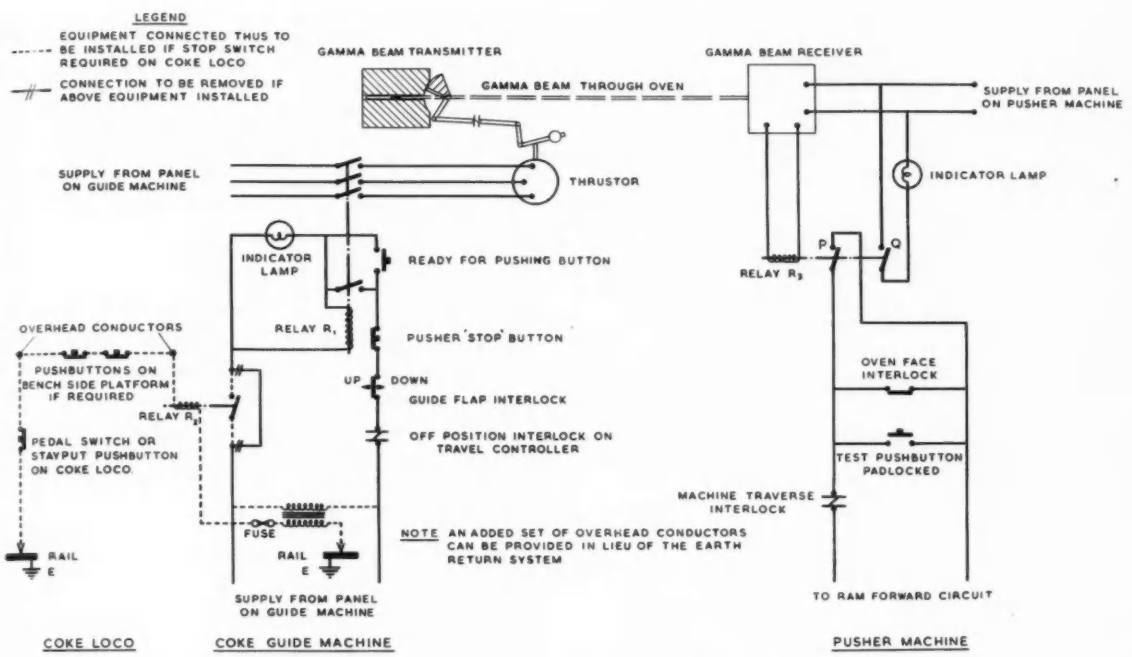


Fig. 2. Typical circuit incorporating the W-D Gamma Interlock.

a specially designed holder having a shutter on one side.

It will be seen by reference to Fig. 1 that the holder is mounted on the coke guide in such a position that when both the oven doors are removed and the shutter is opened, a gamma beam passes through the space between the oven roof and the top of the coke.

The pushing machine carries a geiger-counter in such a position that when the machine is correctly aligned with the same oven as the coke guide the gamma beam is picked up by the geiger-counter and closes a relay switch in the ram-forward travel circuit and at the same time illuminates a green indicator light mounted in the pusher machine cabin which shows that everything is ready for the pushing operation.

The gamma beam is of sufficient strength to penetrate some roof-carbon or loose pieces of coke, but will be stopped if only one door is left in position. The isotope is unaffected by the heat and dust which are likely to be met with in operation. It is adequately shielded so that complete safety is ensured to personnel on the coke guide, and the radiation received on the pushing machine is

Fig. 3. The gamma beam transmitter on the coke guide.

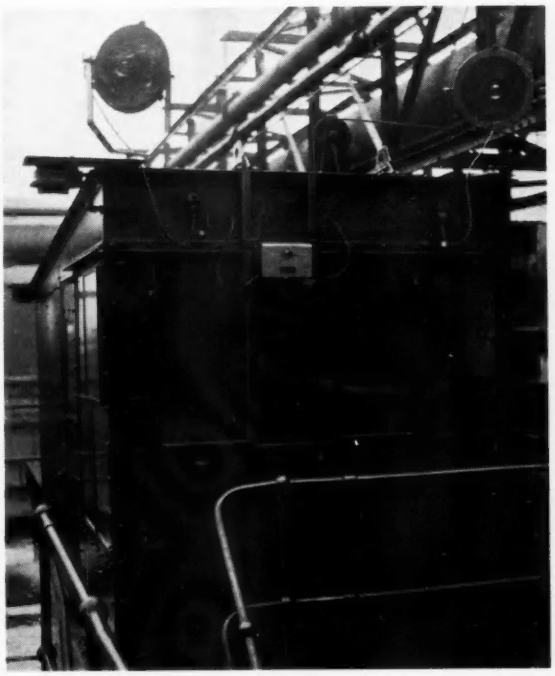


Fig. 4. Geiger counter receiver on pusher machine control cabin.

well below the safety tolerance accepted by H.M. Factory Inspectorate.

The strength of the isotope is so chosen that it should have an effective working life of four to five years. It can be easily replaced but this operation should be carried out by a qualified person.

The geiger-counter apparatus for receiving the gamma beam and converting it into a usable electrical impulse is a simple and robust piece of electronic equipment and is made by Isotope Developments Ltd., of Aldermaston, Berks.

At the N.C.B. Monkton coking plant, the signalling device comprising the gamma beam transmitter Fig. 3 and the geiger-counter receiver Fig. 4 is incorporated into an oven machine interlocking scheme.

In operation the oven doors on the coke guide and pusher sides of the battery are removed in the normal manner. The coke guide with the shutter of the gamma beam transmitter closed and the ram are aligned with the oven in the usual way.

The coke car is brought into its correct position relative to the coke guide. When aligning the ram with the oven the ram can be advanced to the face of the charge in the usual way but no further until the relay switch is closed while the geiger-counter receiver is receiving the gamma beam.

Fig. 5. The Gamma Interlock equipment in operation on the Monkton works of the Durham Division of the National Coal Board.

Beam Picked Up

The coke guide operator then presses a 'push-button' which opens the shutter on the gamma beam transmitter by means of an electric thrustor actuating through a linkage system. If everything is as it should be, the gamma beam is picked up by the receiver on the pushing machine, the relay switch in the ram forward travel circuit closes and the green indicator lamp lights up. The pushing operation can then be carried out.

When the forward movement of the ram is completed and the ram is being withdrawn, the coke guide operator closes the shutter of the transmitter by pressing a second push-button which does not interfere with the backward movement of the ram since the relay switch which is operated by the gamma beam is connected into the ram forward circuit only.

A further safeguard is provided if the coke guide operator forgets to close the shutter of the transmitter after the ram has completed its forward travel. On moving the guide travel motion controller from the 'off' position in order to traverse the coke guide, the shutter is automatically closed.

The forward movement of the ram can be interrupted at any moment by the coke guide operator operating the 'push-button' and closing the transmitter shutter. The ram, however, can be withdrawn from the oven.

It is obvious that the signalling device comprising the gamma beam transmitter and the receiver can be incorporated into various interlocking schemes. At Monkton, the opening and closing of the transmitter shutter is under the control of the coke guide operator but the coke car operator can also interrupt the forward motion of the ram through a push-button and collector rail system.

Mechanical Linkage

At the Pretoria coke oven plant, the shutter of the gamma beam transmitter is operated by means of a mechanical linkage the handle of which is situated on the chassis of the coke guide in a position accessible only to the coke car driver from the cabin platform.

The apparatus can be installed on most existing coke oven plants and Fig. 2 shows a typical circuit incorporating the Gamma Interlock.

The circuit by which the thrustor on the coke guide is actuated includes interlocks for the travel motion of the machine and for a guide flap or guide racking motion if fitted. The guide being thus positioned, these interlocking switches are 'closed.' On pressing the 'ready for pushing' button a circuit is completed which energises relay R_1, which in turn closes the switch to the thrustor, movement of the latter opening the shutter of the gamma beam transmitter.

The gamma beam striking the receiver causes it to actuate relay R_2, thus closing switch P which enables the ram 'forward travel' circuit to be energised when the ram controller is actuated. At the same time an indicator lamp is lighted by the closure of switch Q.

Apart from the usual machine traversing interlock included in the ram forward travel circuit a locked test button is fitted by means of which the Gamma Interlock equipment may be by-passed if required; the key of this being kept in the custody of a responsible person.

Optional Feature

The 'oven face interlock,' as installed at Monkton, is an optional feature which enables the ram to be moved forward to the oven face prior to the commencement of pushing coke.

The circuit drawn in dotted lines shows how the pusher forward travel may be stopped from the coke car by means of a push-button or pedal-switch via relay R_2. Additional push-buttons can be included in this circuit as shown to provide additional stopping facilities at, say, the ends of the side benches.

Diagrams and illustrations by courtesy of the Woodall-Duckham Construction Co., Ltd.

Name Changed

The National Smoke Abatement Society has changed its name to the 'National Society for Clean Air.' The Society also becomes an incorporated body, being registered as a company limited by guarantee and without share capital, and with permission to omit the word 'Limited' from its name.

New Address

The head office of the Colonial Gas Association, Ltd., and Colonial Gas Holdings, Ltd., has moved to new premises at Chelsea House, 55, Flemington Road, North Melbourne, Australia. All communications in respect of stockholders on the English register should, however, still be addressed to Hove.

From a paper to Eastern Section, I.G.E., December 4, 1957.

Current Problems in the Development of the Industrial Gas Load

By A. H. BIRD, M.B.E., Assoc.M.Inst.Gas E.,
INDUSTRIAL SALES MANAGER, TOTTENHAM DIVISION, EASTERN GAS BOARD.

THERE are two trends involving the combustion characteristics of town gas which are of concern to industrial gas engineers who are responsible for maintaining and developing the industrial load.

On one hand there are certain industrial customers demanding gas with combustion characteristics which vary within narrower limits than hitherto, on the other, the integration of manufacturing stations which may each produce gas of different quality. Furthermore, there is now the promise of a greater variety of gases, both base load and peak production, from the newer types of gas making plant and unconventional feedstocks.

The purpose of this paper is to outline the problems these trends create in our customers' factories. There are several industrial uses of gas which are supersensitive to variation of the combustion characteristics.

They fall into two groups—1, gas used for heating, 2, gas used for its chemical properties only.

In this context the term 'supersensitive' is applied to those industrial uses which are adversely influenced by changes in gas quality which would not noticeably affect the performance of domestic appliances or the general run of industrial gas equipment. The term 'combustion characteristics' is used in a slightly more restricted sense than is current in the industry and will embrace only chemical composition, combustion air requirement, flame speed and specific gravity. 'Gas quality' will be used with the same meaning. Nearly all the uses under review for gas for heating, involve the direct application of flame to work pieces in automatic machines. The burners used are generally small and have multi-drilled flame ports designed to operate with the theoretically correct air/gas mixture supplied under pressure. The flames must have a precise form and deliver a specific amount of heat in unit time to a relatively small area of the work piece. Too much heat, too little heat, or heat applied to the wrong spot result in spoilt work. The majority of these applications are believed to be in the glass working processes in the manufacture of electric lamps and radio valves, but others are to be found.

Difficulties Arise

Although gas has been supplied for most of these uses for many years, it is well to note that difficulties now arise, or become acute, because modern machines work much faster than their older counterparts and also because work pieces are often smaller and their dimensional tolerances less. Furthermore, the manufacturers in the trades in question have a more accurate appreciation of the factors affecting the quality of their products and the causes of rejects, and this includes any contribution that variation in gas quality might make to the debit side of their production balance sheet. Workers too, whose earnings are directly related to their output of saleable goods, quickly become aware of factors affecting the size of their wage packets.

In the metal manufacturing industries, on the other hand, there is an extensive and growing demand for gases with suitable chemical composition for enveloping work while undergoing heat treatment. Such gases are commonly termed protective atmospheres. The general requirements are that the gas, or mixture of different gases, should be capable of preventing oxidation of the work and often even discoloration, with a view to eliminating subsequent cleaning processes and machining which involve loss of metal, waste of time and general expense.

In the hardening of medium and high carbon steels it is often also desired to prevent either carburisation or decarburisation of the metal. As in the clean or bright heat treatment of alloy steels success depends largely upon having the constituent gases present in the correct ratios one to another when in the critical range of temperature of the particular process. When bright annealing tough pitch copper, to give an example, it is necessary to prevent hydrogen embrittlement of the metal (as well as oxidation) which results from the presence of more than about 1% of H_2 in the atmosphere in contact with the hot metal.

Techniques have now been perfected for the case hardening of steel in a gaseous medium instead of the older methods of packing in solid carburising compounds in boxes or in cyanide salt baths. In this process a gas of constant composition is required to act as a carrier for the carburising agent, which is usually propane.

Town gas, suitably treated, can meet most, if not all of these requirements and can do so conveniently and economically in competition with other sources of gas supply. The specifications for these atmosphere gases differ widely and according to the process. The important thing about them is that their chemical composition shall not vary beyond permitted limits.

The foregoing remarks relate to the use of prepared atmospheres in gas heated muffle furnaces or electric furnaces. It is therefore interesting to hear that recent work has shown that consistent results in the clean annealing of copper can be achieved in direct fired gas furnaces (which are very economical), if automatic compensation can be made for any changes that do occur in the combustion characteristics.

Sulphur Must be Removed

In this process, as would be expected, it is essential to remove any sulphur from the gas before supplying it to the furnace.

The availability of direct fired gas furnaces in which the heating medium also provides a controllable protective atmosphere should put our industry in a strongly competitive position in respect of capital, running and maintenance costs within this field.

The effects of changes in combustion characteristics for heating applications make it essential that the burners deliver heat at a constant rate and that the flames retain the desired length and form. It will be clear that if the flames shorten back from the correct length the work piece will not receive sufficient heat. If the flames lengthen and become 'gassy,' as the operatives term it, overheating and distortion will occur. Furthermore, undesirable blackening of the glass may result from the chemical reduction of the lead oxide in it. Assuming the gas and air supplies are adequate, their pressures constant and the control valve settings unaltered from a previously correct regulation, undesirable effects will be produced, as one would expect, by changes in specific gravity and chemical composition, the latter possibly involving a small change in the calorific value. Restoration of the correct operating condition on the glass blowing machine requires the readjustment of up to 40 valves which when expertly done takes five minutes. In this period 250 stems may have been spoilt or the equivalent production lost.

In 'atmosphere' generation it will be observed that the air/gas ratio is set by adjusting the relative sizes of orifices (actually valves of one kind or another) in the air and gas lines respectively, across which a pressure differential is main-

tained by a motor driven compressor. A change in the specific gravity of the town gas being used will, of course, alter the air/gas ratio of the mixture delivered to the generator and consequently the chemical composition of the atmosphere gas produced will be changed. It is also to be noted that in exothermic generators the temperature within the combustion chamber would alter with any appreciable change in the air:gas ratio, and that the combustion chamber temperature affects the composition of the resulting atmosphere gas. Changes in the chemical composition of the town gas will naturally affect the composition of the atmosphere gas generated.

The unwanted effects on the work in the wide range of processes and materials treated in generated atmospheres include oxidation, discoloration, carburisation, decarburisation, sooting, and in the case of oxide bearing copper, hydrogen embrittlement.

An important point is that processes employing special atmospheres commonly involve materials and manufactured parts on which a considerable amount of work has been expended, particularly in respect of surface finish, therefore spoilage of them is usually a serious and costly matter.

The author would record it as his personal experience that industrialists and their technical staffs are without exception ready to extend the fullest co-operation to members of the gas industry involved in a problem related to their factory. What they require in respect of supersensitive appliances is not necessarily a gas of unvarying quality from one year's end to the next—though that would be the ideal—but constancy throughout a shift or the duration of a process. Sudden changes are the bugbear.

The question as to which property of the gas most nearly reflects change in combustion characteristics of significance to the industrial process under consideration is often debatable. And the decision as to which property should be controlled, in any attempt to compensate for changes, is also affected by the availability of appropriate instruments.

Specific gravity is of prime importance in all applications, and the A.T.B. number is of significance, since it is a valuable indicator of changes and has the virtue of its being easily and continuously measured on site. To date the Wobbe Index and the instruments available for its automatic control have proved the most useful. The constancy of the calorific value is taken for granted since statutory requirements impose a minimum value and economic considerations dictate that the declared value shall not be exceeded by more than a very small amount.

It may have been gathered from the descriptions of supersensitive processes that their tolerance of change of combustion characteristics is not equal. That is a fact which makes it impossible to prescribe limits that are generally applicable, even in one kind of process. And as there has been no considerable or co-ordinated investigation of these tolerances one can only quote particular instances.

As a guide, the following tolerances relating to lamp making machines in a single factory and all applying to fully aerated flames direct to the work, but performing different operations, are given.

Operation	Tolerance of W.I. Nos.
Stem making on ultra fast machine	±10
Stem making on a good standard 'T.7' machine	±20
Tipping, i.e., sealing of the exhaust tube	±20
Sealing of the flared portion of the mounts into the main lamp tube ends	±25

In the same factory on the most supersensitive machines it has been observed that undesirable effects results from changes in specific gravity of the order of 3% and of A.T.B. numbers of about 5.

In respect of atmosphere generation it is difficult to quote tolerances in town gas quality or in the chemical composition of atmospheres generated from it without becoming involved in complex gas to gas and gas to metal equilibria and temperatures. In a few processes the limits are narrow, in others there is wider tolerance, but in each free oxygen must be excluded. An idea of the limits in one of the more exacting applications may be gained from the following example. When bright annealing tough pitch copper in a conveyor furnace, arranged to give the work a quick hot run, in an exothermic atmosphere derived from town gas the tolerances are CO + H_2 1.6% maximum and 0.8% minimum, with CO_2 about 11% and the remainder nitrogen. Within these limits both oxidation and hydrogen embrittlement are prevented.

The author has not come across any supersensitive heating application in which the presence of sulphur is objectionable. In the use of protective atmospheres some processes can tolerate the full normal sulphur content of town gas, the bright annealing of mild steel in a rich endothermic atmosphere is an example. When sulphur compounds are injurious they are removed after combustion or reaction of the air/gas mixture by means of bog ore, activated carbon or catalysts in ways familiar to gas engineers.

Having outlined some of the problems that arise in our customers' factories, the several possible causes of variations in combustion characteristics at a particular premises will be examined and corrective measures suggested.

Meeting Places

In distribution systems into which gas is fed at different points from two or more gas works, there will exist in the mains network boundaries or meeting places of the several different gases sent out. The geographical positions of those boundaries will move according to the relative rates at which the several gases are delivered into the mains and by the rates of consumption of the consumers about the area in question. A consumer located near the normal position of the boundary will most likely find from time to time that he receives gas from two works in quick succession. If the gas sent out from the several works differs markedly in characteristics, that consumer will notice it if he possesses supersensitive plant. The changes may occur at predictable times or they may occur quite erratically.

It can be mentioned in passing that one factory in the Tottenham Division is known to be sited near the boundaries of three different gas manufacturing stations. Clearly this factor will be significant at a particular factory only if the site is near the 'boundary' and the different gases vary widely from one another.

Changes in combustion characteristics due to the addition of gas from peak load plant to the base load make are, of course, no new thing. At the beginning and end of the winter season, and at times of high peak demand within it, variations in the percentage of C.W.G. sent out, for example, can cause distress in the factory. A number of factories are known which are sensitive only to such marked changes. And it has been found that timely warning passed from the gasworks to the factory is generally sufficient to avoid trouble.

It is realised that this last suggestion necessitates a close and perhaps unusual liaison between the gas undertaking and these customers, but it is believed that this is an extension of service necessary to retain their goodwill and this class of business. Where the less pronounced changes are harmful, control on the customer's premises may well be the only solution.

If gas is received at the factory in question from one works only, the possibility of variations occurring in the send out from that works within the course of a day is not to be overlooked if effects of the kind mentioned above are noticed. In the author's experience of these problems at Tottenham, this factor has been hardly evident. However, it is known that the limitations of manufacturing plant and holder capacity at stations in other parts of the country have caused unavoidable variations within the course of a day large enough to disturb supersensitive appliances.

If the delivery of gases of markedly different combustion characteristics from different works into a common grid is unavoidable there are several possible ways of helping a customer out of difficulty.

In one instance the service to an affected factory was transferred from the common L.P. main to a H.P. main carrying gas from a single works. This simple expedient completely removed a long standing cause of complaint. It is also mentioned here to give substance to the remarks in the paragraph on short terms variations. The closing of a suitably located valve in the mains system may enable the Distribution Engineer to shift the 'boundary' relative to the affected

factory. This method was tried with some success at Tottenham one summer, but had to be abandoned when higher demands for gas were made in the winter by other consumers in the locality. The use of a valve in this way has possibilities that might prove completely successful in other circumstances.

The investigation of changes in combustion characteristics at a certain factory revealed that the times of their occurrence were closely related to the times and duration of boosting at one of the gasworks. So close was this relationship that boosting was subsequently programmed to cause the change to occur in the lunch break and again in the afternoon tea break; times at which adjustment of the 'fires' would be made in any event. The time and duration of boosting are therefore both a possible source of trouble and of its solution. It is to be noted that this particular works delivers most of its output under high pressure to distant holders but boosts the gas which is surplus to the H.P. requirements into the local L.P. mains. These circumstances permit some latitude in the times of boosting.

Action Limited

Until about two years ago action on the shop floor was limited to manual adjustment of air:gas ratios after indication of gas quality change had been given by spoilt work, an A.T.B. or, in the case of atmosphere generators, an automatic gas analysis apparatus. There was no reliable instrument available for automatically compensating for the changes.

Attempts were made in Enfield to control thermostatically a lamp stem machine with the aid of a radiation pyrometer sighted on a heated target that simulated the work pieces. The results were not encouraging. A device for automatically controlling the cone height of a bunsen burner, fed with a 60/40 air:gas mixture, was developed by the South Eastern Gas Board. The controlled mixture was used on various electric lamp making machines to which the remaining combustion air was piped from a separate air compressor. The device and method proved satisfactory in the operating conditions obtaining.

At the same time as this work was being carried out, a Sigma Wobbe Index recorder was installed at the Thorn Electrical Industries, Ltd., lamp works in Enfield. The W.I. and A.T.B. readings were compared with the performance of the machine, and it appeared as if control of the W.I. of the gas supplied would eliminate the troubles already proved to be due to changes in combustion characteristics. George Kent, Ltd., in collaboration with the Sigma Instrument Co., Ltd., produced a Wobbe Index controller which was put into operation in January, 1955. This consisted of a Sigma W.I. recorder fitted with Kent Mark 20 compressed air operated control equipment. The method of controlling the W.I. of the town gas is to inject enough air into the gas stream to depress the W.I. a little below the lowest figure likely to obtain in the town gas supplied. This controller has satisfactorily compensated for changes in combustion characteristics ever since its installation over two years ago.

It can now be asserted with confidence that troubles in lamp and valve factories due to varying combustion characteristics alone can be eliminated with the aid of the Sigma-Kent Wobbe Index controller. The author had not had personal experience of the effects of gas quality variations in other direct flame applications such as hacksaw blade hardening, yarn gassing and the high speed drying of printers' ink. But there appears to be no reason why the instrument should not be perfectly effective in those processes if variation problems arise.

The success achieved in the lamp works led to the installation of a similar controller of an exothermic atmosphere generator serving a copper bright annealing plant at the Enfield Rolling Mills, Brimsdown.

The method adopted was to control the W.I. of the air/gas mixture being delivered to the generator's combustion chamber. Compensation for changes in combustion characteristics of the town gas supplied was made by increasing or decreasing a continuous bleed of neat town gas into the mixture gas stream. As on most exothermic generators the air/gas proportioning and compressing plant was a Selas machine. The air:gas ratio was near the full theoretical requirement and produced an atmosphere of CO_2 11%; CO + H_2 2%; N_2 the remainder. A James Gordon & Co., Ltd., Duplex 'Mono' recorder was used to analyse the atmosphere gas generated. The W.I. controller worked satisfactorily within the limits imposed by the size of the neat gas bleed arrangements and with the gas supplied to Brimsdown.

A further development in the control of the W.I. of air/gas mixtures from Selas machines is the provision for the direct adjustment of the proportioning valve setting by means of a pneumatic power cylinder under the control of a Sigma-Kent W.I. controller.

The use of a W.I. controller on atmosphere generators will certainly compensate for some changes in the combustion characteristics in the town gas used. But owing to the number and complexity of the physical and chemical relationships involved, it would be unwise to assume that it would be completely effective in all possible changes until further research and field tests have been carried out. It seems desirable to mention that there are other factors which can produce similar effects to those rightly attributable to variations in combustion characteristics.

Those relating to the fuel supply are listed below:

(a) Inadequate gas or air compressor capacity for maximum load.

(b) Inadequacies in the air or gas distributing pipe systems; pressure fluctuations arising therefrom.

(c) Incorrect sizing of atmosphere generators relative to their duties, affecting the temperature/composition relationship.

(d) Burners with air/gas mixing devices, pipes or burner flame ports that are inadequate to handle air/gas mixtures of a quality within the range to be expected in the local gas supply.

About 4% of the industrial gas load in the Tottenham Division is used in processes and plant supersensitive to changes in combustion characteristics. This represents the consumption of about .5 mill. therms per annum, which is used in 14 different factories plying nine distinct trades. It would be interesting to know what the National or Eastern Area figures are.

A significant feature of this class of business for the gas industry is that new production techniques and machines are enlarging its bounds. Older 'non-sensitive' processes are becoming involved and new supersensitive ones developed. If we are to win these new loads we must be able to deliver to the plant gas of suitable and consistent quality. We have many competitors in this field.

In heating applications they are liquid petroleum gases, propane and butane, and in atmosphere generation, cracked ammonia, cracked and burnt ammonia, burnt L.P. gases (exothermic), reformed L.P. gases (endothermic), and charcoal gas.

However, town gas has the advantages of availability, continuity of supply and usually of price. In our endeavours to increase the use of gas in industry it is vital to retain and strengthen our customers' confidence in our fuel. Erratic performance or a costly failure in one department might prejudice our chances of gaining a load of another kind elsewhere. Conversely, success in the newer and more 'scientific' applications will promote our business in general and keep our staff in good heart. Success is the salt of the salesman's life.

This is an expanding market and one in which our industry could gain or lose a good deal of prestige. The possibility of our customers using automatic compensating devices is a valuable aid to our exploiting it, but such instrumentation will not always prove an economic proposition. The complete answer lies in the standardisation of gas quality within an integrated distribution system and keeping the combustion characteristics of the gas delivered within fairly narrow limits —if that be practicable.

DISCUSSION

Mr. J. H. Dyde (Deputy Chairman, Eastern Gas Board), opening the discussion, said he first became conscious of the importance of gas quality during his tour of America in 1952. From 1946 onwards, the Americans had been faced with the problem of changing from manufactured gas of C.V. of 500 B.Th.U. per cu.ft. to a natural gas of 800 B.Th.U. per cu.ft. and had developed a burner for comparing different gases. The American problem had been very great and a phased change from manufactured to natural gas had been made. The peak load problem in America was immense and was sometimes as great as 13 or 14:1 so that many other types

of gases made in peak load plants were necessary to support the natural gas supplies. The shortage of coal supplies in Europe was the cause of similar problems occurring there, and these were set out in a paper by Delruge to the I.G.U. at Brussels in 1951. Last year in a paper to the Institution Gilbert & Prigg had presented all the facts about gas interchangeability.

Mr. Bird had achieved a lot by working so closely with the production and distribution departments of his Division together with the instrument and appliance designers. However, it was economically impractical to supply a uniform gas to comply with supersensitive burners, but instead a thorough understanding of the constituent gases was essential. In every distribution system the limitations of production and supply must be known and understood. This would involve much more frequent gas testing to maintain the variation of the Wobbe Index to within 3% of a constant value, though in certain cases 10% was permissible. Testing by A.T.B. and a controlled Wobbe Index were essential for constant gas quality. The most complete co-operation between production and distribution departments was needed so that the different conditions holding in summer and winter could be counteracted and this would include the availability of oil or other gases used at peak load periods. Further developments should be sought with the instrument makers to design instruments which could be used for correcting irregularities on the spot.

Problems Unknown

Mr. E. O. Rose (Divisional Engineer, Tottenham E.G.B.) said knowledge of gas utilisation and information about gas characteristics should be more widely known since there were places in the country where such problems as they had to solve were quite unknown. Difficulties over gas characteristics had started in 1928, when street lamps in a certain part of Enfield lit back at 5.55 p.m. each evening. This had been solved by boosting the gas in that particular area. Trouble had been caused in the Brimsdown area by gases of different characteristics entering the area from different works. By using A.T.B. tests the wrong gas had been kept away and reasonably constant characteristics maintained. It was unfortunate from the point of view of gas supply that factories had been built in this very area just before the war, and latterly Thorn Industries, Ltd., had installed these supersensitive glass fabricating machines. These had shown that boosting and juggling with sources of gas supply were not satisfactory and some other means must be found.

At the beginning of their efforts to solve these difficulties, no means of keeping the gas characteristics within the permitted tolerances existed, but now the Wobbe Index controller had been introduced a means was available on the spot. Control of Wobbe Index can deal with $\pm 10\%$ variation or even as much as 25% in one works. Perhaps with increased integration of grid supplies and the manufacture of gas in fewer and larger works, these problems would be easier to solve. Mr. Rose recommended that Gilbert and Prigg's paper should be more widely read, and showed a diagram from which the safe limits for a G4 burner could be seen. From this he showed that such a burner could be more tolerant of the type of gas it burned than would have been expected from its design. Wobbe Index was not everything; flame speed, too, was important. Since Wobbe Index was measured as 2¼ in W.G., it was not applicable to ungoverned supplies. At 4-5 in. W.G. G4 gas will burn in a G5 burner. It was important to know exactly what was happening in the burners of these glass fabricating machines.

In a thermostatically controlled oven, Wobbe Index was not so important, but in such appliances as hot plates and gas fires and in chemical atmospheres too, it was of the utmost importance. He thought that there was much work to be done on flame length since this had such a vital effect on the heating properties of gas flames. For the control to be complete, full gas analyses were needed from which the gas characteristics could be calculated, and these analyses should be carried out far more frequently.

Mr. G. E. Thomas (Watford) said much research work on these problems had been done and was still being done. He referred to Mr. Bird's remarks about action being taken outside the consumers' premises rather than within them. Recurrent problems inside were often very insidious, and to overcome them there should be much more liaison with the consumer and instrument manufacturers. Investigations were going on at the London Research Station of the Gas Council on these problems, and from observations of his own he had found that Wobbe Index variation was aggravated by inadequate burner ports. In some cases it had been necessary to increase these by anything up to 200%. He advocated much closer study of the individual tasks expected of the gas burners and of the individual processes in which special atmospheres were needed. Different work needed different flame shapes and particular flame characteristics. Some carburising processes demanded very narrow limits in chemical composition, and these processes should be studied on a national scale.

It was disturbing to think that propane was gradually creeping in, though often mixed with a coal gas containing 5% unsaturated hydrocarbons.

Mr. W. A. Evetts (Engineer, Watford Division Eastern Gas Board) was struck by the ingenuity of the whole conception of the attempt to supply gas of such constant characteristics. For it to be successful the works and distribution staffs must join forces in making it possible. The idea behind the control of the gas for any particular machine on the spot and the method by which it was carried out was particularly striking.

Mr. G. C. Farmer (Assistant Engineer, Ilford, Ltd.) said it was gratifying to note that Mr. F. E. Mills, in his experiments at Watson House, had confirmed the experiences of Mr. Bird in industrial practice. Further experiments had been made in the furnace application by the British Non-Ferrous Metals Research Association, under the direction of Mr. Eborall. Though their results had not been published, he understood that similar conclusions had been reached. The complex problems relating to the mixture of gases from any source were largely aggravated by the present Statutory requirements, which were now out-dated. The Heyworth Report had suggested that a check should be kept on specific gravity; this would have been difficult enough in the days of conventional gas-making plant, but today it would make the production engineer's task impossible. The supply of gas at a fixed Wobbe Index to the consumer would ensure that an efficient fuel could be supplied to industry and the domestic consumer, which would enable the most sensitive apparatus to be operated efficiently.

Active Competitors

The public would be ready to accept this change if the benefits were explained and the anomalies of the C.V. standard made clear, particularly since the industry was now under public ownership and there were ample safeguards to ensure that the consumer received value for money. Since the electrical authority suffers no such restrictions, it would strengthen the gas industry's case in competition with L.P. gases and liquid fuels in industry.

Mr. S. A. King (R. & A. Main, Ltd.) referred to a remark in Mr. Bird's paper about the many competitors the gas industry had in its campaign for the industrial gas load. He said that such competitors were extremely active and might easily get dangerous. The gas industry therefore must be careful to see that its fuel was completely satisfactory and invariable in quality.

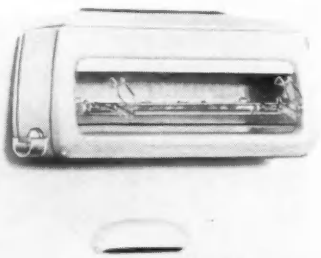
Replying, Mr. Bird referred to the work done in America which he would benefit very much from studying. Gilbert and Prigg's work was mostly concerned with bunsen flames which did not apply to the supersensitive type of flame since 'light back' and 'lift' were not problems he had to face. It was only in the continuous processes that the characteristics must be completely constant. For the smaller factory with shorter working periods, the working day was enough for the characteristics to be kept constant.

He agreed with Mr. Rose and pointed out that air requirements varied with C.V. and showed that air requirements $\sqrt{\text{sp.gr.}}$ was very nearly equal to the Wobbe Index. Mr. Thomas's remarks about checking the size of burner ports were sound and he agreed with him.

The chemical constitution of carburising gas was a difficult problem because the users did not really know what they wanted. Some used a method of dew point control and injected propane for this, but he thought some means of methane content control was needed.

Mr. R. J. Garvin (Royston) proposed a vote of thanks.

NEW WORLD RANGETTE



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Colours — White or Cream.

Overall Height 47" Width 32½" Depth 22½"

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A robust, large-capacity cooker intended primarily for small hotels, cafes and boarding houses. Also suited for domestic purposes in the larger household. Comprises a large Regulo-controlled oven with double doors, a spacious but simply designed hotplate incorporating six Radoflex boiling burners with safety taps and a dual Eye-Level Grill. Fits close to the wall.

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Service-free Gas Valve

A COMBINED gas valve and automatic pilot safety control has been introduced by a leading American manufacturer of instruments and controls. The device eliminates installation and wiring of separate pilot safety control. The gas valve portion is described as being service-free. (See picture above.)

The pilot control is attached to the upstream side of the gas valve and includes a filter for the pilot gas. Pilot gas flow is adjustable to full shut-off. All models of the new device have a safe-light feature. It meets all approval requirements of American Gas Association Laboratories and is intended primarily for residential central heating units. The makers are Minneapolis-Honeywell Regulator Company.

British Standard for Steel Tubes and Tubulars

THE British Standard for Steel tubes and tubulars suitable for screwing to B.S. 21 pipe threads (B.S. 1387:1957) supersedes the 1947 edition. It applies to welded and seamless, screwed and socketed steel tubes and tubulars and to plain-end steel tubes suitable for screwing to B.S. 21 pipe threads. Three thicknesses of tubes are specified—light, medium and heavy—with nominal bores of $\frac{1}{8}$ in. to 6 in. inclusive.

In 1951 the International Organisation for Standardisation (ISO) began work in which the B.S.I. took an active part, on recommendations for international standards for steel tubes. As a result, draft ISO recommendations were issued for the type of tube dealt with in B.S. 1387. The tubes specified in the present edition of the standard conform to the ISO series.

The new publication differs from the 1947 edition in the following main respects:—*a*, The minimum outside diameter for medium and heavy tube is the same as the maximum diameter of internal thread and therefore slightly less than for Classes B and C; *b*, the total outside diameter tolerances for medium and heavy tube of 1 in., $1\frac{1}{4}$ in. and $1\frac{1}{2}$ in. nominal bore have been decreased from 0.031 in. to 0.030 in. The tolerance for tube of 2 in. nominal bore has been decreased from 0.045 in. to 0.040 in. and that for tube of $2\frac{1}{2}$ in. nominal bore from 0.050 in. to 0.045 in.; *c*, some of the thicknesses of both heavy and medium tube have been increased by one standard wire gauge and some decreased by one or two gauges; *d*, the weights per foot of both plain-end and screwed and socketed tubes are the ISO agreed values; *e*, the ISO recommendation that there should be no limit on the plus tolerance on thickness has been adopted; *f*, the weight tolerance on a single tube has been altered from minus $7\frac{1}{2}\%$ to minus 8% plus 10% in conformity with the ISO recommendation; *g*, the random lengths now specified are 13 ft. minimum; and *h*, new identification colours have been adopted for the medium and heavy tubes.

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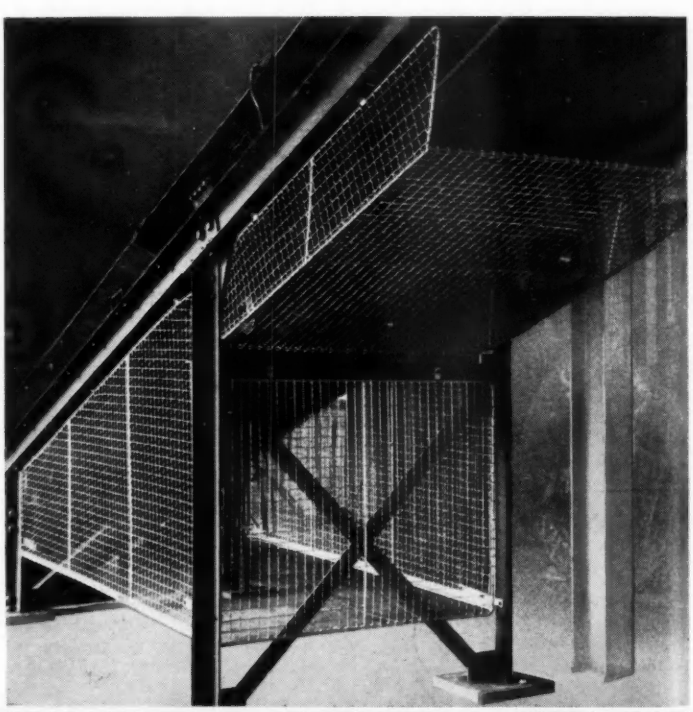

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GAS ON THE CONTINENT

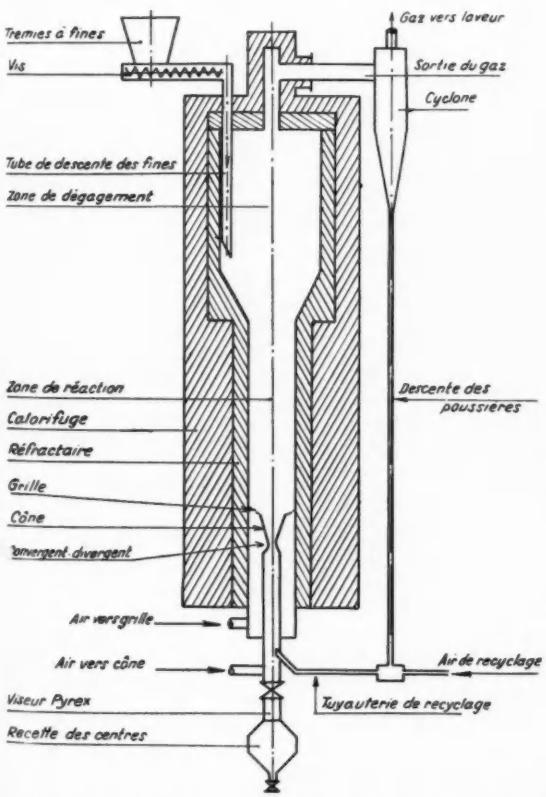
Fluidisation in the Gasification of Coal Fines

AN experimental generator in which they had carried out tests on a new process of gasification of fine coal by fluidisation was described at the 29th International Congress of Industrial Chemistry in Paris by MM. L. Longchambon, L. Jequier, and G. Van de Putte.

A study of previous practice, particularly in the Winkler producer, showed that it should be possible to make use of softening of the ashes for their extraction without carbon content, and therefore by working at a high temperature to recover, away from the gasification zone, the sensible heat of the gas produced. In the Stouff furnace, which is in the form of an inverted pyramid, the fuel is burned, as fines, in suspension in a current of ascending air. In this way it is also classified by size. The ash is extracted at the base of the producer, as grains varying in size and in degree of agglomeration.

In spite of the high velocity of the gas there is very little contamination of it by dust thanks to the softening of the ash which appears on the surface of the particles as combustion proceeds. As two particles collide they stick to one another and as this process continues globules of ash are formed. As these increase in size, they fall to the bottom of the apparatus and can be easily extracted. The Stouff furnace does not work by fluidisation because the velocities, and therefore the proportion of voids, are much higher than in dense-phase fluidisation; a furnace is very different from a producer and there is no question of being able to pass from the one to the other.

With these facts as a basis, the authors sought to devise a process of gasification of fines by fluidisation with the following characteristics:—



Schematic drawing of the apparatus: Left hand from top to bottom—hopper for fine coal, screw feed, feeder tube, zone of liberation, reaction zone, insulation, refractory lining, grate, cone, convergent-divergent, air to grate, air to cone, pyrex screw, ash receiver; right hand—gas to washer, gas offtake, cyclone, ash tube, recycled air, and tube for recycled air.

1. The extraction of agglomerated ash.
2. A high temperature of gasification.
3. Heating by partial combustion in oxygen.
4. Recovery of the sensible heat of the gas produced, first by the fines in one or several fluidised stages, then by means of gasification in heat exchangers of the usual type.

Theoretical calculations showed that high efficiencies were possible and that in the manufacture of water-gas oxygen consumption would be low. There was, however, one great difficulty to be surmounted—the extraction of the ash—and only practical trials could solve this problem.

The first idea was to replace the grate by a cone with a point at the bottom. The velocity of the air entering at this point would be high enough to prevent the fines from passing but would allow larger particles to fall. Trials, however, showed immediately that there was no fluidisation but merely a violent and disorderly agitation which caused numerous and significantly large channels ('rat holes') to appear. Further, there was no efficient separation of fine and large particles.

In a series of small scale tests in the cold a means of extracting the large particles falling on to the grate was sought while good fluidisation conditions were maintained. Several complicated systems were tried but they could not be used hot since, if the higher temperature caused a softening of the ash, this ash must not be in contact with surfaces on which it might stick.

Finally a simple design in two parts was arrived at. The first part, a grate, only receives a fraction of the gas used to fluidise the mass, and the second part, an inverted cone, receives the rest of the gas and permits the extraction of the larger particles. The point of the cone ends in a 'convergent-divergent' and prevents the fines falling on to the sides of the cone and into the gas inlet.

The tests with the small scale generator shown in the schematic drawing presented numerous difficulties which were gradually overcome. Finally the authors succeeded in producing the ash as spherical grains of the dimension required which did not contain more than 0.5% carbon. The size of the grains is effected by the temperature and by the supply of air to the base of the cone; larger grains are formed as the temperature rises and the supply of air increases.

The composition of the gas is not as good as one could wish for since the contact-time is small—of the order of 2 to 4 tenths of a second. In fact, with so small an apparatus, it would be impossible for the fluidised bed to be deep enough without causing eruptions and other inconvenient irregularities. Furthermore to obtain a sufficient output, and to maintain the larger grains of coal in suspension the velocities must be pretty high. Such velocities also have the disadvantage of carrying away the smaller grains but these can be mostly recovered in a cyclone. The recovered dust is re-introduced with the air fed to the base of the cone, where it burns immediately and the ash formed sticks to the airborne grains, which are later extracted.

Analysis showed that the fines recovered in the cyclone have the same composition as the original feed. They have, therefore, undergone no chemical change but have been entrained on arrival in the chamber by the high gas velocity and show no signs of combustion. The grains which are gasified, agglomerate, however, before their weight is sufficiently reduced for them to be entrained in the current of gas.

In the course of the tests made in this apparatus—tests which it is true have never lasted more than a few hours—there has never been any adherence of the ash to the refractory lining. This lining is based on a concrete made from Secar 250 (pure aluminate of calcium carbonate) and corundum. In view of these results it has been decided to proceed with experiments on a larger scale and to construct an apparatus capable of gasifying 300 to 500 kg. of coal per hour. It is hoped that the excellent results obtained in the laboratory will be confirmed and that the new process will show substantial progress in the gasification of coal.

Chimie et Industrie, Sept. 1957

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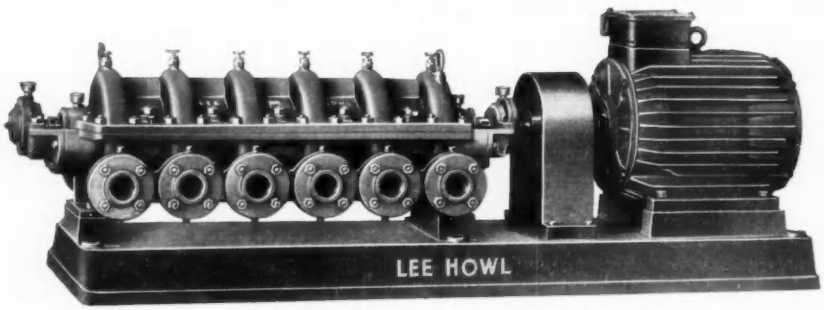

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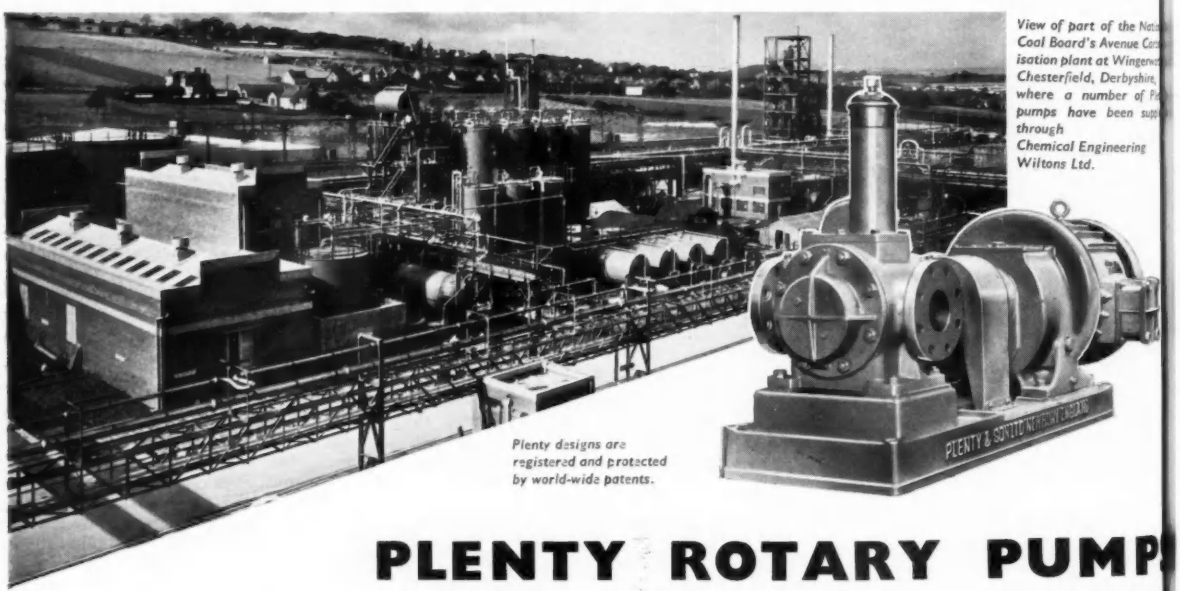

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